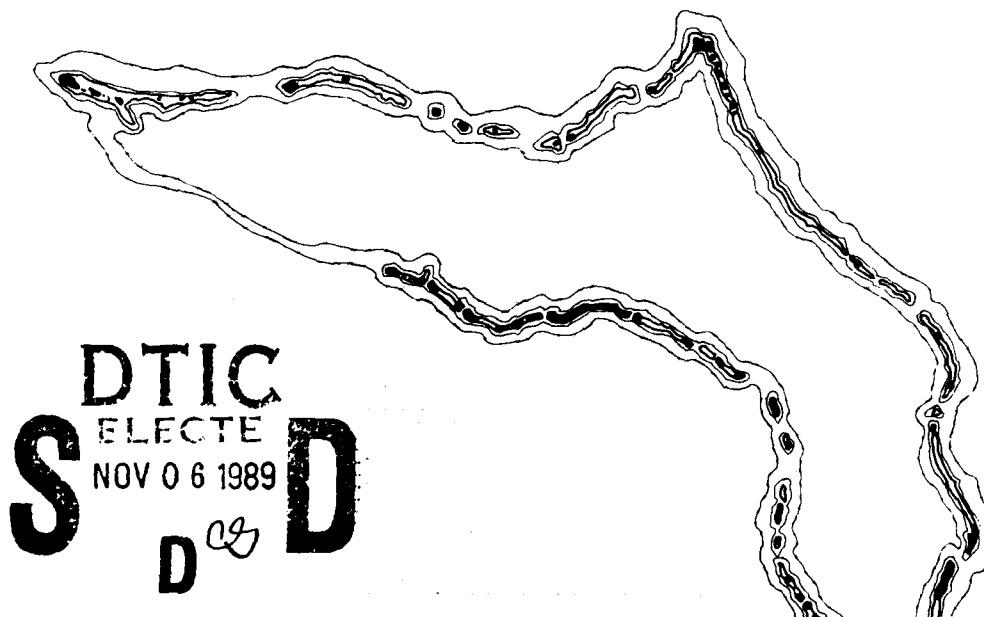


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Final Environmental Impact Statement

Proposed Actions at U.S. ARMY KWAJALEIN ATOLL



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U.S. Army Strategic Defense Command



October 1989

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HUNTSVILLE, ALABAMA 35807-3801

REPLY TO
ATTENTION OF

CSSD-H-SSP (200)

MEMORANDUM FOR Interested Government Agencies, Public Groups,
and Individuals

SUBJECT: U.S. Army Kwajalein Atoll (USAKA) Final
Environmental Impact Statement (FEIS)

1. Enclosed is a copy of the FEIS for proposed actions at USAKA. The proposed actions would include continuation of current activities at USAKA and planned non-Strategic Defense Initiative (SDI) activities as well as proposed SDI activities.

2. The Environmental Impact Statement (EIS) comprises two volumes. The draft Environmental Impact Statement (DEIS) that was issued in June 1989 is the volume that describes the proposed actions, the alternatives considered, the affected environment, the environmental consequences, and mitigation measures. The FEIS completes the material that makes up the whole of the EIS for the proposed action. It includes:

a. Transcripts of the public hearings that were held on 13 July 1989 at Ebeye and Majuro in the Republic of the Marshall Islands.

b. Comments on the DEIS that were submitted by government agencies and the public during the 23 June to 7 August 1989 public comment period.

c. Responses to the comments. It also contains additions and revisions to the DEIS where clarification or additional information was needed.

3. The Army plans to issue a Record of Decision later this year. The Record of Decision will explain the Army's decision about the proposed action and alternatives examined in the EIS, and will describe the mitigation measures the Army plans to implement.

Accession For	
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Unannounced	<input type="checkbox"/>
Justification	
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CSSD-H-SSP

SUBJECT: U.S. Army Kwajalein Atoll (USAKA) Final
Environmental Impact Statement (FEIS).

4. The point of contact is LTC Ronald Keglovits, CSSD-H-SSP,
AUTOVON 788-3616 or 205-895-3616.

FOR THE DEPUTY COMMANDER:

Encl



ARNOLD H. GAYLOR
Colonel, AR
Deputy for Operations

LEAD AGENCY: U.S. Army Strategic Defense Command

COOPERATING AGENCIES: Strategic Defense Initiative Organization
U.S. Army Corps of Engineers

TITLE OF THE PROPOSED ACTION: Provide test range facilities and support services at U.S. Army Kwajalein Atoll for ongoing and Strategic Defense Initiative activities.

AFFECTED JURISDICTION: U.S. Army Kwajalein Atoll, Republic of the Marshall Islands

ADDITIONAL INFORMATION: U.S. Army Strategic Defense Command
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APPROVED BY: Robert D. Hammond
Lieutenant General, USA
Commander
U.S. Army Strategic Defense Command

DOCUMENT DESIGNATION: Final Environmental Impact Statement

ABSTRACT: The purpose of the Proposed Action is to conduct tests and collect data in support of continuing research, development, and operational missions; operational space track missions; and Strategic Defense Initiative (SDI) research, development, test, and evaluation (RDTE) activities.

Three alternatives are considered in the Environmental Impact Statement (EIS). The No-Action Alternative includes the ongoing activities at USAKA. The Proposed Action includes installation and testing of SDI sensing/tracking equipment and interceptor missile systems. Four construction projects in support of base operations are also included. Finally, the EIS examines a Change of Duration Alternative that implements the Proposed Action over a longer period of time.

The EIS examines the environmental impacts of each alternative. Where impacts were found to be potentially significant, mitigation measures are identified. Key topics addressed by the EIS include land and reef areas, water resources, air quality, noise, biological resources including endangered species, cultural resources, socioeconomic, transportation, utilities, electromagnetic radiation from radars, and range safety.

EXECUTIVE SUMMARY

INTRODUCTION

The Proposed Action is to provide test range facilities and support services at U.S. Army Kwajalein Atoll (USAKA) for continuing research, development, operational missions, operational space tracking missions, and Strategic Defense Initiative (SDI) activities. USAKA has served as a Department of Defense (DOD) Major Range and Test Facility Base (MRTFB) since the late 1950s.

This environmental impact statement (EIS) is prepared in compliance with the National Environmental Policy Act (NEPA) and its implementing regulations, DOD Directive 6050.1, and Army Regulation (AR) 200-2, Environmental Effects of Army Actions. The relationship between the United States and the Republic of the Marshall Islands (RMI) is currently governed by the Compact of Free Association Act of 1985, Public Law 99-239, dated January 14, 1985. All environmental controls and standards imposed by Title I, Article VI, of the Compact of Free Association have been applied in developing this EIS. As envisioned in the Compact, USAKA is engaged in the development of specific standards to address the environmental issues applicable to USAKA in conjunction with the U.S. Army Corps of Engineers, the U.S. Department of State, and the U.S. Environmental Protection Agency, Region IX. With the adoption of appropriate mitigations and the finalization of the specific standards, the Army believes that full compliance with the applicable U.S. environmental standards will be achieved. Adoption of these standards will be accomplished in consultation with the Government of the Republic of the Marshall Islands. Until these alternate standards are established, standards substantively similar to all applicable U.S. environmental laws will be applied at USAKA.

The scope of this EIS includes an analysis of impacts from ongoing operations in order to provide a baseline for the evaluation of future test and evaluation activities and related construction.

As part of the EIS process, scoping meetings were held at Majuro and Ebeye in the Republic of the Marshall Islands and in Honolulu, Hawaii, during March 1988. Concerns were expressed about adverse impacts on the physical environment, public health and safety, and social and economic conditions.

Issues raised in the scoping meetings were addressed in the Draft EIS (DEIS), which was filed with the Environmental Protection Agency and made available for public review on 23 June 1989. Public hearings on the Draft EIS were held at Ebeye and Majuro, RMI, on 13 July 1989. Comments raised at the public hearings and in comment letters are addressed in the Final EIS.

The Final EIS contains revisions to the DEIS that are made in response to comments or are based on the availability of new information. The revisions include more current data on the quality of groundwater, potable water, and marine water; new noise and air quality sampling data; additional information about electromagnetic radiation from both existing and proposed radars; and information about improved waste handling practices already implemented at USAKA.

ALTERNATIVES

This EIS considers three alternatives:

- **No-Action Alternative.** This alternative is for the continuation of USAKA mission activities. It includes missile launches for test flights, meteorological data gathering, radar calibration, the sensing and tracking of incoming reentry vehicles for DOD test programs, and space surveillance. Test programs are supported by radar and optical sensing equipment, telemetry, communications, and other technical range support facilities. Base operations include all the activities required to support a community of almost 3,000 people in an isolated location--transportation, utilities, housing, community support, maintenance, and repair services.

The No-Action Alternative is the environmentally preferred alternative. It must be noted, however, that all but three of the twelve significant negative environmental impacts that were identified in the EIS already exist and would continue to exist under the No-Action Alternative. These negative impacts have the potential for greater stress on the environment under the Proposed Action or Change of Duration Alternatives. Mitigation measures identified in the EIS have the potential to avoid or reduce to insignificant levels all negative impacts.

- **Proposed Action.** This alternative considers SDI testing at USAKA together with ongoing and planned non-SDI activities. The proposed SDI testing includes the launch of target and interceptor missiles from Meck, Omelek, and Roi-Namur Islands. Other tests involve the sensing and tracking of reentry vehicles through the use of existing radars and a major new radar facility (the Ground-Based Radar), as well as other sensing and tracking instruments (both existing and new). Meck Island, previously used for other programs, will be rehabilitated for SDI launches. Omelek Island, now used primarily for meteorological rocket launches, will be the site of new launch facilities. Construction on Kwajalein includes a desalination plant and family housing. On Roi-Namur, it includes a sewage treatment plant and document control facility.
- **Change of Duration Alternative.** This alternative differs from the Proposed Action only in that testing of two SDI activities would be delayed, one for 5 years and the other for 2 years. The purpose of considering the Change of Duration Alternative is to determine whether some environmental impacts could be lessened by rescheduling some SDI testing to reduce the peak levels of population increase.

An alternative was considered that would reduce or eliminate missile testing in the Pacific Ocean region. USAKA's location is a critical factor for missile testing because it provides security and a high degree of safety. A Pacific Ocean missile test range is also critical for tracking the NASA space shuttle and other United States and foreign space objects. Because missile flight testing is an essential part of developing and maintaining a credible defense systems, this alternative was determined to be unreasonable.

Moving the USAKA facilities and functions to another location in the Pacific Ocean was also considered unreasonable because of the long delays such an extensive relocation would cause in SDI development.

AFFECTED ENVIRONMENT

Kwajalein Atoll is a crescent-shaped coral reef that encloses the world's largest lagoon. In contrast to the vastness of its water area, the land area of the atoll is only 5.6 square miles. The environment of Kwajalein is the

product of millions of years of natural processes, followed by a brief but critical period of human activity. During World War II, Kwajalein Atoll was subjected to severe air, land, and sea bombardment. Today, USAKA is a key facility in the Western Test Range, one of two national test ranges permitted to carry out testing under the 1972 Anti-Ballistic Missile Treaty. With some exceptions, noted below, USAKA's environment is healthy.

Water Resources

Abundant rainfall is the primary source of freshwater for plant, animal, and human life. Because the groundwater aquifer is limited, water conservation techniques are a necessary and routine part of life at USAKA. Marine water quality around USAKA islands has generally been satisfactory, except in a few localized areas.

Air Quality and Noise

The air quality is generally good throughout the atoll. USAKA's few stationary sources present localized air quality impacts.

Noise is usually not a problem. There is an average of two to three rocket launches per month from several of the populated and unpopulated islands of USAKA.

Island Plants and Animals

There is a wide variety of plants, seabirds, shorebirds, and other terrestrial animals on the USAKA islands. The flora are diverse and the fauna abundant.

Marine Biological Resources

Kwajalein Atoll has a large and complex coral reef ecosystem and an ocean environment that is typical of the Western Mid-Pacific region. More than 650 species of marine plants and animals inhabit the atoll and its reef system. Habitat is present for threatened or endangered seaturtles, rare giant clams, and seagrasses.

Archaeological, Historical, and Cultural Resources

Because of Kwajalein's long history of human occupation, there is a possibility of finding cultural deposits and remains in locations where there are present-day human activities.

Land Use

At USAKA, a variety of Army and other DOD facilities and activities support sensitive missile research, development, and testing. These activities and the services necessary to support them exist in a very small area in which all spatial patterns of land use are closely controlled and efficiently managed.

On Kwajalein Island, for instance, a community of approximately 3,000 people live and work on 748 acres. The scarcity of land on Kwajalein in relation to the numbers of people and the intensity of USAKA activities has forced an efficient and environmentally sound land use pattern.

Socioeconomic Conditions

All of the people at USAKA are either employed in support of the defense mission or are dependents of personnel who are employed in support of the mission. Housing is a continuing concern, in part because of USAKA's remote location and extreme environmental conditions.

Transportation

Because of Kwajalein's isolation and island geography, marine and air transportation are critical. Facilities are generally adequate even though their use, particularly for air service, is heavy.

Utilities

Solid and hazardous materials and waste disposal pose an acute problem at USAKA, as does the provision of an adequate water supply. On Kwajalein and Roi-Namur, utilities include permanent facilities for water supply; wastewater collection, treatment, and disposal; solid waste; and power generation. For the most part, these facilities are at capacity.

Energy demand is large because of the numerous defense-related facilities and services and, among other factors, the heavy air-conditioning load.

Range Safety and Electromagnetic Radiation Environment

Range safety is defined as those measures that are established to prevent injury, protect personnel and the general public, and minimize damage to property. It is always a priority at a military test range. At USAKA, its importance is emphasized (even more than at most ranges) because USAKA

encompasses the takeoff or splashdown zones for some of the most sophisticated weapons testing in the nation's arsenal. Electromagnetic radiation (EMR) is emitted from USAKA's many radars and communications facilities. A well-defined program to protect inhabitants from safety hazards and from EMR is in place at USAKA. The effect of new programs on these systems is, therefore, a part of this EIS.

IMPACTS AND MITIGATION

The Proposed Action would accomplish a critical step in the testing of SDI elements, following the schedule established to ensure the timely development of a Strategic Defense System.

Impacts and mitigation measures for the Proposed Action are summarized below. The matrix presented at the end of this summary shows a comparison of the alternatives, their impacts, and mitigations.

- Freshwater. Demands on the Kwajalein groundwater lens would increase, particularly during drought periods. The potential to overpump the groundwater lens would increase the possibility of temporary groundwater quality degradation because of saltwater infiltration. Also, increased mission activities would increase the potential for contamination of the lens well system. The proposed Kwajalein desalination plant would mitigate the increased demands on the groundwater lens system. Improved hazardous materials and waste handling procedures would minimize the potential for contamination.
- Marine Water Quality. Impacts on marine water quality--because of inadequate solid and hazardous waste management practices, treated sewage effluent at Kwajalein, untreated sewage effluent at Roi-Namur, dredging, and quarrying--would all increase as a result of the higher population and level of activities. Mitigation for impacts that result from sewage, solid waste, and hazardous waste are described in their respective sections.
- Air Quality. The increase in solid waste burning and power plant operations would exacerbate the existing exceedances of air quality standards. The new Power Plant 1A may contribute to air quality standard exceedances. Air quality impacts could be mitigated by additional air quality con-

trols, reduced power plant operations, increases in stack heights, and installation of a solid waste incinerator with air pollution controls.

- Island Flora. Construction of a missile launch facility on Omelek, depending on where it is finally sited, could require the removal of parts of one of Omelek's three stands of native trees. Careful siting of the proposed facilities could reduce the number of trees that would have to be removed. Trees that must be removed could be transplanted to other locations.
- Marine Biological Resources. Increased quarrying and dredging would produce short-term, localized, insignificant impacts. The proposed sewage treatment plant on Roi-Namur would reduce impacts to marine life from untreated sewage effluent. To minimize shoreline erosion, quarries would be sited at least 100 feet from the outer reef edge. Harbor improvements at Omelek could cause a localized impact to the rich coral biota near the existing jetty. This impact could be mitigated through careful site planning and construction practices.
- Rare, Threatened, or Endangered Species. Increased operations could put additional pressure on rare giant clams (T. gigas) and seagrass beds. As mitigation, USAKA plans to issue a regulation that will be based on RMI Environmental Protection Agency regulations prohibiting the taking of T. gigas. Giant clams could be transplanted from areas where they might be damaged by USAKA activities.
- Archaeological/Cultural/Historical. The proposed construction of a launch facility on Omelek could disturb subsurface archaeological resources. Depending on final siting and on construction practices, proposed construction at Kwajalein and Roi-Namur could disturb subsurface historical resources. Increased population and activity on those islands could have an indirect impact on these same resources. Ground-disturbing activities should be planned so that known sites of archaeological, cultural, or historical resources will be protected. Pre-construction sampling of the Omelek site would determine their extent, nature and significance. If the proposed facili-

ties cannot be located to avoid a significant site entirely, a preconstruction data recovery program would be appropriate.

- **Socioeconomic Conditions.** The nonindigenous population at USAKA is expected to increase over the current figure of 2,972, but will not exceed the historical maximum. The population would increase by 403 in 1992 and 1993 and would drop in 1994 to an increment of 315 (excluding temporary construction workers). In 1997, there would be zero population increase. A shortage of family housing units is predicted for the No-Action Alternative and would be further increased by the Proposed Action, even after construction of 130 proposed new family housing units. Unaccompanied personnel housing is also projected to be deficient. USAKA has requested additional funds for housing, including the construction of 400 units of unaccompanied personnel housing. Use of substandard trailers will continue.

Taxes paid to RMI would increase because of the greater number of construction and operations personnel at USAKA.

- **Transportation.** The marine transport of equipment and supplies to support the new SDI launch facilities on Meck would require a small craft berthing facility at Meck. Other impacts on marine and ground transportation would be insignificant.
- **Utilities.** Increased demands on the Kwajalein Island freshwater supply that would result from a larger population would exacerbate both the supply and water quality problems identified for the No-Action Alternative. The proposed desalination plant would mitigate these impacts.

Increased demands on the wastewater treatment system at Kwajalein Island could result in periodic discharges of excessive suspended solids that would exceed primary treatment criteria. Water conservation, additional biological treatment capacity, and an additional clarifier would mitigate predicted impacts on the Kwajalein Island wastewater treatment system if further analysis shows that capacity will be exceeded. The proposed sewage treatment plant on Roi-Namur would eliminate the discharge of untreated sewage.

The increase in population and activity at USAKA would exacerbate already inadequate solid waste management practices. Impacts could be mitigated by constructing facilities and instituting practices that would ensure acceptable disposal. New facilities should include an incinerator and sufficient improvements to the existing landfill to meet accepted standards.

Again, the increase in population and activity would worsen already inadequate hazardous materials and waste handling practices. Impacts could be mitigated by constructing new facilities and instituting new procedures. New facilities would include storage, an industrial furnace, and an acid neutralization unit. Aboveground fuel storage tanks at Kwajalein Island should be upgraded.

Energy consumption would increase, mainly because of the electrical demands of the new ground-based radar. Construction of Power Plant 1A on Kwajalein (now under way) will ensure that adequate generating capacity is available there. Renovation and expansion of the power plant on Meck Island ensures adequate capacity on that island.


Environmental Resource	No Action		Proposed Action		Change of Duration Alternative	
	Regional ¹	Local ²	Regional ¹	Local ²	Regional ¹	Local ²
Land and Reef Resources	○		○		○	
Groundwater		●		● M		● M
Marine Water Quality		●		● M		● M
Air Quality		●		● m		● m
Noise						
Island Plants				● m		● m
Island Animals				○		○
Marine Biological Resources	○		○	● m	○	● m
Rare, Threatened, or Endangered Species		●		● m		● m
Archaeological Resources		○		● m		● m
Historical Resources		○		○		○
Land Use						
Population						
Nonindigenous			○		○	
Marshallese						
Employment						
Nonindigenous			*		*	
Marshallese						
USAKA Housing	●		● M		● M	
Income/Fiscal Conditions	*		*		*	
Health, Education, Recreation						
Transportation			○		○	
Water Supply		●		● M		● M
Wastewater		●		● M		● M
Solid Waste	●		● m		● m	
Hazardous Materials/Waste	●		● m		● m	
Energy			○		○	
Aesthetics						
Range Safety						
Electromagnetic Radiation						
LEGEND <ul style="list-style-type: none"> ● Significant Negative Impacts ○ Insignificant Negative Impacts m Potential Mitigation M Mitigation as Part of the Alternative * Positive Impact <p>Notes: Blank = No Impact Please review the text of Section 2.5 for an explanation of the impacts and mitigations summarized here.</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>¹ Regional Impacts: More than one island and/or large area affected.</p> <p>² Local Impacts: Only one island and/or localized effects expected.</p> </div> </div>						
 <p>U.S. ARMY KWAJALEIN ATOLL ENVIRONMENTAL IMPACT STATEMENT U S Army Corps of Engineers</p>			<p>COMPARISON OF ALTERNATIVES, IMPACTS, AND MITIGATION</p>			

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Appendix

Chapter 1 INTRODUCTION

1.1 FORMAT OF THE FINAL EIS

The Environmental Impact Statement (EIS) for Proposed Actions at U.S. Army Kwajalein Atoll comprises two volumes. The Draft EIS (DEIS) that was issued in June 1989 is the volume that describes the purpose and need for the Proposed Action; detailed examinations of the alternatives considered, the affected environment, and the environmental and socioeconomic consequences; and mitigation measures.

This volume--titled "Final Environmental Impact Statement for Proposed Actions at U.S. Army Kwajalein Atoll"--completes the material that makes up the whole of the EIS for the Proposed Action. It includes the transcripts of public hearings that were held to solicit public input, comments about the DEIS that were submitted by governmental agencies and the public, and responses to these comments.

Chapter 4 of this volume contains additions and revisions to the DEIS where clarifications or additional information were needed. These changes are organized to correspond to referenced sections of the DEIS and should be read in conjunction with that volume. New material is presented in indented italic format for ease of identification. Additionally, the Executive Summary of the DEIS has been revised and is included with this volume.

All public and agency comments received have been addressed in this Final EIS. Each comment made at the public hearings and those received in writing have been assigned a number. These numbers are printed in the margins of the transcripts of the hearings (Chapter 2) and the letters (Chapter 3). Responses are numbered to correspond to the coding of the comments. The coded comments are presented in a format that shows responses on the same page.

1.2 EIS PUBLIC NOTICE AND PUBLIC INVOLVEMENT

The Notice of Intent to Prepare a Draft Environmental Impact Statement for the Operation of U.S. Army Kwajalein Atoll (USAKA), Republic of the Marshall Islands (RMI) was published in the Federal Register on February 2, 1988. Scoping meetings were held at Central Intermediate School in Honolulu on 28 March 1988, Ebeye Elementary School, Kwajalein Atoll, on 24 March 1988, and Majuro Courthouse on 24 March

1988. A scoping meeting for interested U.S. federal agencies was held at Fort Shafter, Honolulu, on 21 March 1988. Information gained at the scoping meetings was used to identify the issues addressed in the EIS.

The DEIS was filed with the U.S. Environmental Protection Agency (EPA) and made available for public review on 23 June 1989. Copies of the DEIS were placed at the Majuro Public Library, the Grace Sherwood Library on Kwajalein Island, and the Office of the Chief Secretary's Representative on Ebeye Island. Copies of the DEIS were mailed to approximately 180 agencies and individuals, including all who had requested a copy of the Draft EIS at the scoping meetings.

The RMI government was formally notified that the DEIS had been issued and that public hearings had been scheduled. In addition, the USAKA commander met with the Chief Secretary and other RMI officials to explain the findings of the DEIS.

Notice of the hearings was published in the Marshall Islands Journal (a dual-language weekly newspaper published at Majuro) on 30 June 1989 and 7 July 1989, and in the Hourglass (the USAKA weekly newspaper, published at Kwajalein) on 29 June 1989 and 6 July 1989. Notices in both papers were published in English and Marshallese.

At Majuro, a detailed article in the 30 June edition of the Marshall Islands Journal focused on Strategic Defense Initiative (SDI) plans and the upcoming hearings. At USAKA, COL Philip R. Harris, USAKA Commander, called attention to the upcoming hearing on Ebeye in the "Commander's Column" in the 6 July edition of the Hourglass. Publicity was also provided by repeated announcements on the televised community bulletin board during the 2 days preceding the Ebeye hearing. The announcements reminded viewers about the hearing and the special ferry service to Ebeye for the hearing.

The first hearing on the Draft EIS was held at the Majuro Courthouse on 13 July (Majuro date); the second was held the next evening at the Ebeye Elementary School on 13 July (Kwajalein date). Verbal comments at both hearings were recorded by a court reporter; in addition, participants were invited to submit written comments at the hearing or to the Strategic Defense Command in Huntsville, Alabama, through 7 August 1989.

Twenty-two comments were made at the two hearings (19 at Majuro and 3 at Ebeye). In addition, three written comments were turned in at the Majuro hearing. A total of 25 comment

letters containing 128 comments were received by the Strategic Defense Command.

Comments were received from federal agencies, private organizations, and individuals. Table 1-1 is a list of commenters. Lists of all public comments are in Tables 1-2 and 1-3.

Comments covered a wide range of subjects, as indicated in Table 1-4. All comments are coded. For the public hearings at Majuro and Ebeye, they are designated by an M or E followed by a numeral. The letters are coded in a similar fashion with L followed by a numeral (assigned in the order in which letters were received) and a "point number" (which shows a comment or comments within a specific letter).

A number of commenters had questions about hazardous and solid waste practices at USAKA and expressed concerns about potential effects on the drinking water supply. Health and safety concerns about electromagnetic radiation from radars were the subjects of several comments. There were also a number of comments about the value of SDI testing at USAKA and other policy issues.

Table 1-1
USAKA DEIS COMMENTERS

	Governmental Agencies	Organizations	Individuals
<u>Public Hearing/Majuro</u>	Ronald Cannarella, Environmental Protection Authority, Republic of the Marshall Islands Elizabeth Harding, Environmental Protection Authority, Republic of the Marshall Islands		Alfred Capelle Jerry Cramer David Chappell Michael Ogdan David Strauss
<u>Public Hearing/Ebeye</u>			Abon Jeadrik Richard Jung
<u>Comment Letters</u>	U.S. Department of Commerce National Oceanic and Atmospheric Administration U.S. Department of Interior Geological Survey U.S. Department of Interior Office of Environmental Project Review U.S. Environmental Protection Agency, Region IX	Chad Wylie, University of Guam Marine Laboratory University of Hawaii at Manoa Valley Citizens for a Safe Environment Lawyers Alliance for Nuclear Arms Control--Massachusetts Chapter Women's International League for Peace and Freedom	Katherine W. Broun Betty Burkes Judith Cicero Jean T. Colby Joel Connolly Amy Cullum Sylvia Furber Helen F. Kaplan Minnie W. Koblitz Winifred M. Lubell Barbara McGee Marie Morongell Joan Patchen Claire P. Pearmain W. Robert Pearmain Lynne Robihan

Table 1-2
COMMENTERS AT MAJURO AND EBEYE PUBLIC HEARINGS

<u>Comment Number</u>	<u>Name</u>
M1	Jerry Kramer
M2	Alfred Capelle
M3	Ronald Cannarella
M4	Ronald Cannarella
M5	David Strauss
M6	Alfred Capelle
M7	David Chappell
M8	David Chappell
M9	Ronald Cannarella
M10	Ronald Cannarella
M11	Ronald Cannarella
M12	Ronald Cannarella
M13	Ronald Cannarella
M14	Ronald Cannarella
M15	Alfred Capelle
M16	Elizabeth Harding
M17	Elizabeth Harding
M18	David Strauss
M19	David Strauss
M20	David Strauss
M21	David Strauss
M22	David Strauss
M23	Michael Ogden
M24	Michael Ogden
M25	Alfred Capelle
M26	Alfred Capelle
M27	Alfred Capelle
E1	Richard L. Jung
E2	Abon Jeadrik
E3	Abon Jeadrik

Table 1-3
COMMENT LETTERS

<u>Letter Number</u>	<u>Correspondent</u>
L1	U.S. Department of the Interior, Geological Survey
L2	U.S. Environmental Protection Agency
L3	Valley Citizens for a Safe Environment
L4	Lawyers Alliance for Nuclear Arms Control, Massachusetts Chapter
L5	Joan Patchen
L6	Minnie W. Koblitiz
L7	Judith Cicero
L8	University of Hawaii
L9	Sylvia Furber
L10	Betty Burkes
L11	Winifred M. Lubell
L12	Lynne Robihan
L13	W. Robert Pearmain
L14	Amy Cullum
L15	Claire P. Pearmain
L16	Katherine W. Broun
L17	Joel Connelly
L18	Barbara McGee
L19	Women's International League for Peace and Freedom
L20	U.S. Department of Commerce
L21	Jean T. Colby
L22	H. F. Kaplan
L23	Marie Morongell
L24	U.S. Department of the Interior, Office of Environmental Project Review
L25	Chad Wylie, University of Guam Marine Laboratory

Table 1-4
COMMENTS ON THE DEIS

Category	Comment Number
Air Quality	L2.8 and L2.9, L3.8, L3.27 to L3.31, L3.44, L8.10, L8.12, L8.13
Alternatives Examined in the DEIS	L3.1 to L3.4, L4.3
Electromagnetic Radiation	E1, L2.18, L3.9, L3.12, L3.22 to L3.26
Endangered Species	M1 to M4, L3.57 to L3.60, L2.2, L24.1, L25.1, L25.2
Environmental Regulation at USAKA	M16, M17, L2.1, L2.11
Hazardous Materials and Waste	M10, L2.2, L2.7, L2.9, L3.9, L3.14 to L3.16, L8.6 to L8.11, L8.14
Island Plants and Animals	L24.2 to L24.4
Marine Biological Resources	L20.1, L20.3
Marshallese Language	M5, M6, M15, M25 to M27
Noise	L3.46 to L3.52
Non-Radar Tracking	L3.18 to L3.21
Policy Issues	M8, L3.5, L4.1, L4.2, L5 to L7, L9 to L19, L21 to L23
Range Safety	M7, L3.6, L3.7, L3.12, L3.13, L3.17, L3.53 to L3.56
Scope of the DEIS	L4.4 to L4.6
Sea Level Rise	M23, M24
Socioeconomic Issues	M19 to M22
Solid Waste	L2.7, L8.3, L8.4
Water Quality	M9, M11 to M14, M18, E2, E3, L1.1 to L1.3, L2.10 to L2.17, L3.10, L3.11, L3.32 to L3.45, L8.1 to L8.4, L8.9

Chapter 2 PUBLIC HEARINGS

This chapter contains the verbatim transcripts of the hearings held at Majuro (13 July [12 July on Kwajalein]) and Ebeye (13 July). Supplementary responses are provided for those comments that required additional information. Also included are copies of overhead transparencies used at the two hearings.

In the following transcripts, numbers have been assigned each comment to assist in identifying responses. For each comment, the initial letter (M or E) identifies the comment as having been made at Majuro or Ebeye. The numeral that follows represents the comment in the order in which commenters spoke. M2, for example, is the second comment made at the Majuro hearing. Responses that were made at the time of the hearing follow the comment in the transcript. Supplementary responses, where necessary to provide additional information or clarification, are coded with the comment number and appear in the right-hand column of the page.

2.1 TRANSCRIPT OF PROCEEDINGS
PUBLIC HEARING AT MAJURO

PUBLIC HEARING

Draft Environmental Impact Statement
Proposed Action at
U.S. Army Kwajalein Atoll

CH2M HILL

Transcript of Proceedings

BE IT REMEMBERED, that a public hearing in the above matter was held at the Republic of the Marshall Islands High Court, Courtroom B, P.O. Box 378, Majuro, Marshall Islands 96960 at 7:00 p.m. on Thursday, July 13, 1989, before COL Philip Harris, LTC Charles Harris, LTC Ron Keglovits, LTC Michael Van Zandt, Raleigh Sakado and Andrew Linehan.

WHEREUPON, the following proceedings were had,
to wit:

Richard L. Lind
Court Reporter

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1 of Engineers, Pacific Ocean Division, which prepared the
2 Draft Environmental Impact Statement. Finally, Andrew
3 Linehan is here from CH2M HILL, a consultant who assisted
4 in the preparation.

5 The agenda on the screen is what we will be following
6 this evening. After I have finished speaking, LTC Harris
7 will discuss the proposed test activities at USAKA. He
8 will explain the environmental impacts identified in the
9 EIS and will describe what we propose to do to lessen some
10 of those impacts. That will be followed by a short break
11 during which time you can prepare comments, and that will
12 be followed by the comment portion of tonight's hearing.

13 The last page in the handout that you have can be used
14 to submit written comments this evening or to request a
15 copy of the final EIS. If you need additional space,
16 please use the back and other paper that you may want to
17 attach. Please turn these comments in here at the table
18 when you depart after the comment period.

19 You should understand that all of the written and all
20 of the oral comments received this evening will become part
21 of the public record for this EIS and will be considered in
22 preparing the final EIS.

23 Through 7 August of this year, 1989, you can also send
24 comments to the address shown here (gesture toward screen),
25 and that address is also located on the bottom of your

1 comment sheet.

2 I would like to take a moment to describe why we have
3 the Environmental Impact Statement.

4 The National Environmental Policy Act requires U.S.
5 federal agencies to prepare an EIS before taking any major
6 action affecting the environment. Under the Compact of
7 Free Association an EIS must be prepared before the United
8 States Government takes any action in the Republic of the
9 Marshall Islands.

10 The National Environmental Policy Act was passed by
11 the United States Congress in 1969 because of the growing
12 concern about the impacts of development upon the natural
13 environment. The act provides that for every major federal
14 action affecting the environment in any significant way, a
15 detailed statement will be prepared describing the
16 environmental impact of the proposed action. The statement
17 must also describe possible alternatives to the proposed
18 action and ways that any adverse impacts to the environment
19 can be reduced.

20 The whole purpose of what has become known as an EIS
21 is to cause the public agency that is proposing an action
22 to consider how it will affect the environment--both
23 natural and man-made environment--and to ask whether what
24 is being proposed is, environmentally, the best way to do
25 it.

1 Once the impacts have been identified, the agency
2 needs to show how adverse impacts can be eliminated or
3 reduced. The agency may also identify some positive
4 impacts that it wants to sustain or encourage. The process
5 allows informed decisionmaking and reveals potential
6 impacts to the public.

7 The EIS has become part of the process of designing
8 any project. The process puts heavy emphasis on public
9 participation. It starts with what is called a scoping
10 meeting to identify public concerns about possible impacts
11 from the project.

12 Many of you may recall the scoping meeting for this
13 proposed action that were held here in March of 1988. A
14 meeting was also held in Honolulu in order to consider the
15 concerns of other public agencies that have
16 responsibilities that affect the environment.

17 Public hearings such as this one tonight here in
18 Majuro and the one we will conduct tomorrow night on Ebeye
19 are organized so that we can receive comments from
20 interested people. We need to know your concerns about the
21 proposed action. If we can this evening, we will address
22 those comments.

23 As I mentioned earlier, written comments will be
24 accepted through 7 August at the address shown in your
25 information packet.

1 A final EIS that covers all the comments and issues
2 raised during the public comment period will be issued
3 later this year. Thirty days later the Army will make a
4 decision about the proposed action. This decision will be
5 published in what's called a Record of Decision, and it
6 will be issued later this year.

7 USAKA is only one of two national test ranges that are
8 permitted to carry out antiballistic missile testing under
9 the 1972 Antiballistic Missile Testing Treaty. Because of
10 its huge lagoon and its location USAKA plays a critical
11 role in testing defense systems such as elements of the
12 Strategic Defense Initiative and tracking of space
13 vehicles. These tests are one part of the proposed action
14 that is the subject of this Draft EIS.

15 I would now like to ask LTC Harris to come up and
16 discuss the EIS in various details.

17 LTC HARRIS: Good evening. I'm going to review
18 for you the proposed action and the alternatives that are
19 the subject of this EIS. I will also describe how we
20 expect these actions to affect the environment and how we
21 propose to reduce or eliminate any problems.

22 The EIS addresses the current situation at USAKA and
23 the environmental problems associated with these current
24 operations. It also looks at environmental problems of the
25 proposed action and alternatives.

1 The proposed action for this EIS includes both ongoing
2 and planned USAKA programs; that is, the continuation of
3 the kinds of programs that have been going on at USAKA in
4 recent years.

5 These test activities require all kinds of support
6 activities like utilities, housing, and transportation.
7 The proposed actions also include some new SDI tests at
8 USAKA.

9 For some of the new SDI tests, target or interceptor
10 missiles will be launched from USAKA. These tests will
11 require the extensive renovation of existing launch
12 facilities on Meck and Omelek Islands. Some of the work on
13 Meck has already begun. The work at Omelek is not planned
14 to begin before 1992. The first of the launch tests for
15 the ERIS program is scheduled for early next year at Meck.

16 By the way, the acronyms that are used throughout
17 tonight's scenario are posted on the side here--ERIS, I
18 believe, is about the fifth one down.

19 On Kwajalein, the Ground-Based Radar Experimental
20 project will require the installation of a major new radar
21 facility at the existing Building 1500.

22 In addition to the SDI tests that requires new
23 construction or renovation, the proposal also includes
24 other SDI tests that will use the existing USAKA range
25 facilities and other planned non-SDI tests, as described

1 in Chapter 2 of the EIS.

2 Several other construction activities are also
3 proposed. These construction projects are currently
4 scheduled to begin in 1990 or 1991. The desalination plant
5 was identified as essential to assure an adequate supply of
6 potable water. It will use waste heat from Power Plant 1A
7 to distill seawater. The sewage treatment plant at
8 Roi-Namur will eliminate the discharge of untreated sewage.
9 The document control facility will be part of the radar
10 complex on Roi-Namur and will add office and document
11 storage space that is badly needed.

12 Two housing projects at Kwajalein will help address
13 the current lack of adequate housing. The new 130 family
14 units will replace some of the old trailers. The EIS says
15 there were to be two, 200-person buildings to house
16 unaccompanied personnel; however, recent changes in plans
17 will consolidate these units into a 400-person building
18 sited in the Dally tennis court area on Kwajalein. The
19 maps posted on the wall in the back of the room shows the
20 locations of some of the proposed construction. You are
21 encouraged to look at them during the break.

22 In addition to the proposed action, which I have just
23 described, the Draft EIS looks closely at two other
24 alternatives. With the No-Action Alternative, we assume
25 that no new SDI testing would occur at USAKA. However,

1 ongoing and planned non-SDI tests and related support
2 activities would continue.

3 The change of duration alternative includes all of the
4 activities of the proposed action; however, we assume that
5 the testing--but not the related construction--for GBR-X
6 and HEDI would be delayed. This alternative was considered
7 in order to examine the impacts of reducing the peak
8 population at USAKA by spreading the test activities over a
9 number of years. Specifically, HEDI testing would be
10 delayed 5 years, to begin in 1998, and GBR-X testing would
11 be delayed 2 years, to begin in 1995.

12 This alternative reduces the increase of U.S.
13 personnel and their families from just over 400 in the
14 proposal to just over 200, but the increase extends over a
15 longer period. As discussed in your handout, two other
16 alternatives were considered but are not discussed in
17 detail because they were unreasonable.

18 The Draft EIS examines the environmental impacts of
19 the three alternatives. It looks at potential impacts,
20 both positive and negative, to some 26 types of resources.
21 Where there are significant impacts, mitigations have been
22 identified.

23 In Chapter 3 of the EIS, existing environmental
24 conditions at USAKA are described. Although, on the whole,
25 a positive picture is presented, the EIS points out the

1 problem areas in USAKA's current operations. USAKA is
2 already acting to solve some of these problems. One
3 example is that the groundwater at Kwajalein Island, which
4 is an important source of drinking water, is in danger of
5 overpumping and contamination. However, as part of the
6 proposed action, a new desalination plant using heat from
7 the new power plant has been proposed. This should reduce
8 the risks associated with relying so heavily on the
9 groundwater lens system.

10 The Draft EIS also points out localized marine water
11 quality problems, including potential contamination due to
12 inadequate solid and hazardous waste practices; however,
13 the EIS considers improvements in our waste-handling
14 practices to reduce the risk of contamination.

15 Some of these considered mitigations are to stop open
16 burning of waste oil, construction of adequate storage
17 facilities, and establishment of controls to track waste as
18 it is generated at USAKA. There are also risks of
19 contamination from the untreated sewage that is pumped into
20 the lagoon through the outfall at Roi-Namur. The proposed
21 sewage treatment plant at Roi-Namur will eliminate that
22 problem.

23 The Draft EIS identified possible noise problems from
24 the Kwajalein power plants and air quality problems
25 downwind of Power Plants 1 and 1A and the solid waste

1 burning pit. We have had air quality and noise monitoring
2 done since the Draft EIS was prepared. The monitoring
3 results indicate that air quality is good and noise levels
4 are within standards. Mitigation considered in the EIS
5 includes continuing to monitor air quality.

6 The Draft EIS addresses the concern that the number of
7 rare giant clams at USAKA may be declining, as they are in
8 other parts of the Marshall Islands. The EIS considers as
9 a mitigation that USAKA write a regulation based on RMI
10 Environmental Protection Agency regulations that prohibits
11 the taking of giant clams by U.S. personnel.

12 There could be approximately 400 additional U.S.
13 personnel and family members at USAKA in 1992, the peak
14 year of SDI testing. The Draft EIS identifies crowded and
15 substandard housing as an existing problem at USAKA which
16 would get worse with the additional population. Two
17 housing projects are proposed to help mitigate the housing
18 problem. These include 400 units of unaccompanied
19 personnel housing and 130 new family housing units on
20 Kwajalein.

21 As I mentioned earlier, the concern about water supply
22 at Kwajalein will be partially addressed by building a
23 desalination plant. Also, a filtration system is currently
24 being installed and is scheduled for completion in March of
25 next year. The current discharge of untreated sewage at

1 Roi-Namur will be eliminated when we build a sewage
2 treatment plant there. The Draft EIS also identifies the
3 potential for overload of the existing sewage treatment
4 plant at Kwajalein.

5 One of the studies for this EIS investigated in some
6 detail current solid and hazardous waste handling practices
7 at USAKA. It showed that the way we have been dealing with
8 the waste generated at USAKA is inadequate. Specifically,
9 open-air burn pits, open dumps, and septage disposal in
10 open trenches are not acceptable disposal methods.

11 In addition, the disposal of waste oil and solvents,
12 batteries, and construction debris is not adequate. Also,
13 although equipment containing PCBs is being replaced, all
14 of this equipment has not yet been replaced nor removed
15 from the atoll.

16 USAKA has begun to address these problems. We are
17 implementing procedures to assure that we know about all
18 hazardous and toxic materials brought to Kwajalein and that
19 we can track those materials and assure that they are
20 disposed of properly. USAKA is committed to begin removing
21 PCBs from Kwajalein by the end of this fiscal year. We
22 also plan to begin implementing the changes in USAKA's
23 waste-handling procedures recommended by the recently
24 developed waste management study.

25 What I have described so far are the environmental

1 impacts of ongoing operations. The Draft EIS also
2 identifies a few new impacts that will result from the new
3 testing.

4 The new impacts will be primarily at Omelek Island
5 where the existing meteorological launch facilities will be
6 expanding for launching test rockets. The existing
7 facilities are just north of a stand of native trees. An
8 archaeological survey located a site inside that grove of
9 trees. It is not clear yet whether the new facilities will
10 require removing any of the trees or building on the
11 archaeological site. Efforts will be made to avoid the
12 archaeological site and the stand of trees. If the
13 archaeological site cannot be avoided, the EIS considers as
14 a mitigation an archaeological data-recovery program.

15 The construction activities at Omelek may also involve
16 improvements or expansion of the harbor area. There are
17 some sensitive coral areas near the jetty at Omelek.
18 Sediments from harbor improvements could drift over to
19 cover and damage the coral. In order to prevent this from
20 happening, the EIS considers as a mitigation that any
21 harbor work at Omelek will be controlled to reduce
22 sedimentation, for example, by using silt curtains around
23 the harbor construction area.

24 What I have described are the principal findings of
25 the Draft EIS. As I mentioned earlier, the document

1 contains much more detail about many environmental
2 resources on the USAKA islands. The maps and the color
3 photographs available tonight show you some of the other
4 issues described in the EIS.

5 Now, before we take a break, COL Harris will say a few
6 more words.

7 COL HARRIS: When we reconvene after the break,
8 we will take comments from anyone who would like to speak.
9 The comments that we cannot address here this evening will
10 be addressed in the final EIS, which as I mentioned will be
11 published later this year. Again, I would remind you that
12 everything said this evening is being recorded so that it
13 can become an official part of the record of this project
14 and to assure that all the comments are addressed in that
15 final EIS.

16 Also, I will remind you that the back sheet on the
17 information packet can be used for comments this evening or
18 to bring comments for the final EIS and to obtain a copy of
19 that final EIS.

20 I would like to make one final point. We have taken
21 the initiative to identify the environmental issues at
22 USAKA and have taken steps to correct those issues as
23 expeditiously as possible. Some of these solutions are not
24 short-term, however. I plan to take immediate action to
25 correct the problems with resources I have personally

1 under my control. For those actions requiring additional
2 resources, we are personally committed to pursuing through
3 Army channels the necessary means to implement the
4 mitigation proposed in the EIS. Protecting the environment
5 at the Kwajalein Atoll and our workforce has our commitment
6 and our support.

7 Let's take a break and we will reconvene at about
8 8:00.

9 (Whereupon, a short recess was taken.)
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1 under my control. For those actions requiring additional
2 resources, we are personally committed to pursuing through
3 Army channels the necessary means to implement the
4 mitigation proposed in the EIS. Protecting the environment
5 at the Kwajalein Atoll and our workforce has our commitment
6 and our support.

7 Let's take a break and we will reconvene at about

8 8:00.

9 (Whereupon, a short recess was taken.)

10 C O M M E N T P E R I O D

11
12 COL HARRIS: All right, I would like to begin
13 again and for your comments, please, for our transcriber,
14 identify yourself, if you have a comment. That way our
15 transcriber will be able to specifically identify you so
16 that we know who it is and we can issue you a final copy of
17 the EIS.

18 Do we have anyone who would like to make comment?

19 MR. KRAMER: Jerry Kramer. You made a comment
20 that involves the Chamber of Commerce. I notice one of
21 your concerns deals with endangered species of giant clams,
22 and the mitigating solution was to write regulations to
23 eliminate them being harvested by Kwajalein personnel. We
24 have a private and a quasi-governmental seeding and giant
25 clam program in the Marshall Islands that is producing

Majuro, RMI/13 July 1989

Page 14

M1

The seeding program in the Marshall Islands uses the
Tridacna derasa variety of giant clam, whereas it is the T.
gigas giant clam that is the species at risk. See Sec-
tion 3.7, page 3-91, of the DEIS for a more detailed explana-
tion of the current status and Subsection 4.7.4 for the
identified mitigation measures.

1 thousands in excess of our requirements, and there are
2 notices and advertisements in the local newspaper, and I'd
3 like you to consider the possibility of reseedling. It
4 would be a valuable business for the Republic of the
5 Marshall Islands and might also help the morale on
6 Kwajalein.

7 COL HARRIS: The specific species identified is
8 not the same one that either the local entrepreneurs or
9 KADA is using to reseed. It's a specific species that is
10 local to this area. KADA does have an action that we are
11 supporting. We currently have a thousand seed clams
12 physically growing within a tank that we've constructed on
13 Kwajalein Island for KADA, and they will probably, within
14 the next 3 to 4 months, be reseeding those in what we call
15 the Mid-Atoll Corridor--that corridor that is segregated.
16 But specifically, it's a species of clams that populates in
17 deep waters and that is one that we're concerned about.

18 MR. CAPELLE: I'm Alfred Capelle. I read the
19 EIS, and there was a letter from a gentleman at the marine
20 group from the University of Hawaii, and I forget his name.
21 It has to do with the concern regarding turtles which is,
22 I believe, an endangered species, and the response was from
23 Mr. Kiauk Cheung from the the Army Corps of Engineers
24 saying that not to worry, there are no turtles that come
25 ashore and lay eggs on USAKA-controlled islands in the

Majuro, RMI Public Hearing, 13 July 1989

Page 15

M2

There are no known turtle nesting areas on the USAKA-leased islands. There are, however, some nesting sites on islands within the mid-atoll corridor that are not USAKA islands. These islands are not specifically addressed in the DEIS because USAKA has neither control over, nor personnel or equipment on them; therefore, the Proposed Action or alternatives will not have an effect on them. See the appendix to the DEIS for letters from the National Oceanic and Atmospheric Administration National Marine Fisheries Service and the United States Department of the Interior Fish and Wildlife Pacific Islands Office.

1 lagoon. But I don't know. I remember going to one of the
2 islands, and I was told that that's a turtle island. I
3 don't know whether that island is. I believe it was in
4 that corridor. So when I read that I was taken.

5 COL HARRIS: We have islands within the Mid-Atoll
6 Corridor on which turtles lay eggs, but each of the 11
7 islands that we rent has personnel on it every day, and we
8 have not recorded sightings of turtles on those specific
9 islands. Yes, we know they do land on other islands within
10 the Mid-Atoll Corridor, but those are private islands and
11 not ones that we physically lease.

12 MR. CAPELLE: So those islands don't belong to
13 you?

14 COL HARRIS: No, not the other islands, no, sir.
15 The belief is that because of the continuous occupation of
16 our 11 islands that has kept the turtles off.

17 Now, we do have a regulation which already prohibits
18 any USAKA personnel from taking a turtle. In fact, we have
19 one individual right now being prosecuted in Hawaii under
20 that section. John?

21 CPT SHORT: Sir, there is not a regulation.
22 Under the Compact or the Hawaii statute, it applies in some
23 instances. That's what this gentleman is receiving
24 prosecution under for the taking of turtles. The Hawaii
25 statute is something separate, and I just wanted to

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clarify that.

M3

MR. CANNARELLA: Ronald Cannarella, from the Environmental Protection Authority here on Majuro Island. On the issue of endangered species, you mentioned the coconut crabs are found on the two islands in the atoll, but you haven't mentioned the regulating of taking coconut crabs. Would you consider including the coconut crabs, if they are on the endangered species list?

COL HARRIS: If the crab is determined to be an endangered species, yes. Of the islands that they are located on, one is one of our 11 islands right adjacent to Roi-Namur and Roi-Namur itself. But as we understand it right now, they are not specified by the Republic statutes or regulations as endangered.

M4

MR. CANNARELLA: So I would assume that that would go for any species of animal that's found to be endangered?

COL HARRIS: We certainly would like to know and support the Republic's efforts on those lines. Yes, sir?

M5

MR. STRAUSS: David Strauss, I'm a resident in the Marshall Islands. A while ago I believe that you stated this draft environmental impact study--one purpose for it--was to inform the public of what the plans were so they could be involved in forming the decisionmaking. I believe that long document is only in English;

Majuro, RMI Public Hearing, 13 July 1989

Page 17

M3

Section 161 of the Compact of Free Association expresses the United States' policy "... to promote efforts to prevent or eliminate damage to the environment and ... to enrich understanding of the natural resources of the Marshall Islands." In implementing this policy, USAKA will take appropriate measures to afford protection to the coconut crab or any other species if designated as endangered by RMI.

M4

See the response to comment M3.

M5

USAKA has requested the aid of Mr. Alfred Capelle, Resources Manager at the Alele Museum and Library, Majuro, in preparing a Marshallese translation of the summary of the EIS. This summary will be distributed to those who attended the hearings at Majuro and Ebeye and will be provided to libraries at both locations. See also the response to comment M15.

1 is that correct?

2 COL HARRIS: That's correct.

3 MS
4 Cont.

5 MR. STRAUSS: I can read English and many of the
6 people of the Marshall Islands can read English, but there
7 are probably the majority of people on the Marshall Islands
8 that cannot read English. I know that everybody assumes
9 that the only person that is going to be bothered to read
10 this is somebody with intelligence. I can assure you that
11 there are a lot of Marshallese that don't speak English but
12 they actually are pretty intelligent. They have just never
13 had the opportunity to learn English.

14 I was wondering, just from a public relations
15 standpoint, would it be feasible for the next time when one
16 of these is filed, do you think it's feasible to have it
17 translated into Marshallese?

18 I understand that 99 percent of the Marshallese
19 probably are not going to read that. But I wonder, again,
20 from a public relations standpoint, if it wouldn't be worth
21 the extra expense to have the thing translated into
22 Marshallese, and you can make a claim that you really bent
23 over backwards to make this known.

24 The reason that I bring this up is that a year or two
25 ago, we had another hearing like this, and Colonel Chapman,
and, if I am not mistaken (and I am sure that the
transcript will show it) I believe that Mr. Capelle or

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1 Cont. someone like that brought up the same issue. I remember
2 the statement being made that that was a very good
3 suggestion and, you know, we are going to pay attention to
4 your suggestion. Of course, now, Colonel Chapman is gone
5 and you are here, and you may say that's a good idea, too.
6 In another 2 years someone else will come in, and we will
7 be going through the same thing again and again. I think
8 that the Marshallese language is important; I think you
9 have to give these people a little dignity when you are in
10 their country. I think it is good for them, and it's good
11 for their self-confidence, and I think they would
12 appreciate it if something like this were translated into
13 Marshallese. That's my comments.

14 COL HARRIS: Certainly, we did not make any
15 attempt to make this document any less dignified for our
16 Marshallese citizens.

17 MR. ROBBINS: That came up in our scoping
18 meeting, sir, with the question of what were we doing to
19 preserve the Marshallese language. I don't think the
20 transcript or my memory says anything about the translation
21 of the document itself. But there was a question of what
22 would we do to preserve the Marshallese language in this
23 document.

24 MR. STRAUSS: Not to argue, but I guess if you
25 just present the document in English, you are certainly

1 not doing a lot to preserve the Marshallese language. You
2 are certainly not promoting its continued use.

3 **M6** MR. CAPELLE: I would like to add my support of
4 that. I'm a staunch supporter of the Marshallese language,
5 and as one of their people, anything that would help keep
6 our language I would like to support. Thank you.

7 COL HARRIS: All right. Is there anyone else
8 that would like to comment?

9 **M7** MR. CHAPPELL: I'm a school teacher here, and I
10 have a two-part question. I'm going to probably sound a
11 bit naive on some of this because I am not an expert on
12 this whole subject of SDI. But as a teacher here, I need
13 to be able to explain this to some of my students.

14 My first concern is one of the things that I don't see
15 as being considered as an environmental impact factor is
16 the idea of exploding re-entry vehicles. So maybe you can
17 just explain to me a little bit about what so far seems to
18 be the picture of how (where) this kind of experimentation
19 over the lagoon, what possible bad consequences could come
20 from them coming in, and going away during this testing,
21 for example; so that I really see this as an environmental
22 aspect that needs to be addressed. You do stress the high
23 safety of the lagoon in Kwajalein and this sort of thing
24 and that's fine, but what exactly does it mean? You are
25 dealing with a pretty open-ended situation, basically,

M6 See the response to comment M5 and the appendix to this document.

M7 Reentry vehicles do not contain explosive devices and have never been known to explode spontaneously. The effects of reentry vehicle interception are discussed in Subsections 3.14.2 and 4.14.2 of the DEIS.

M7
Cont.

1 if something goes wrong. So in terms of the safety of the
2 interception of re-entry vehicles that you have now--
3 let me...

4 COL HARRIS: Right.

5 MR. CHAPPELL: So then I will followup with the
6 second part of that.

7 COL HARRIS: First of all, I would highlight that
8 there are no exploding (either nuclear or high explosive)
9 type weapons that will be used during the interception.
10 It's strictly a kinetic contact. We have the same safety
11 standards for the broad ocean area which we have referred
12 to as the area involved under which debris would touch the
13 waters if it were not burned as it descends through the
14 atmosphere. We have the same safety standards for that
15 area that we have for the lagoon within Kwajalein Atoll as
16 well as what we term Kwajalein north which is the area just
17 north of Kwajalein in the ocean. So those things were
18 considered in the EIS. There is considered to be no
19 significant hazard from anything "falling" or whatever.

20 Now, would you like to address your second part of
21 your comment?

22 MR. CHAPPELL: Okay. My second question that is
23 asked sometimes is whether, in fact, one of the
24 alternatives that was apparently rejected--and I don't
25 really want to drag up old business for you--is whether the

Majuro, RMI Public Hearing, 13 July 1989

Page 21

M8

The purpose of the EIS is to assess the environmental impacts of the proposed actions and alternatives. One of the alternatives evaluated in the EIS is the No-Action Alternative, which means that SDI testing would not take place at USAKA. The question of whether SDI testing will contribute to a practicable, demonstrable result and, in fact, increase the defense of the United States is not an appropriate subject for evaluation in an EIS. This is a political question and is, therefore, not addressed in this EIS.

M8

Cont. testing should be done, perhaps, at all. What I'm asked
is: Considering the fact that the Soviet Union and the
United States have approximately 10,000 nuclear warheads,
the idea of creating interceptors to shoot down that number
of re-entry vehicles won't even put a dent in them without
causing the other side to simply increase the numbers of
their warheads to compensate--seems to make it a rather
futile process, the whole testing program, to me. I wonder
if you can really demonstrate to me that this is a
practicable, demonstrable result that will, in fact,
increase the defense of the United States.

COL HARRIS: I think we'll defer that, because I
don't think that we have an expert here this evening that
can respond to the comment. It will be answered in the
final EIS.

Any other comments?

M9

MR. CANNARELLA: The EIS mentions water quality
exceeded several toxic substances, metals, primarily
copper, as I understand, and also very high levels were
measured in the seafoods, although, I guess they didn't
surpass whatever tolerances for those substances in
seafoods, and that's on page 3-42. Page 3-87 states that
the fisherman eat fish and crab from from every island in
Kwajalein with the exception of two. You do not at all
address the mitigation efforts for those toxic substances.

Majuro, RMI Public Hearing, 13 July 1989

Page 22

M9 See revised Subsection 3.3.2 in Chapter 4 of this volume.

1 COL HARRIS: We have addressed the mitigation,
2 sir. If you will look, those toxic substances are very
3 localized, immediately adjacent to the landfill area and
4 adjacent to an area where metals previously had been placed
5 at the water edge. So we are addressing that, and we are
6 taking an active part in the mitigation to improve the
7 practices of how those substances have been disposed of.

8 M10

9 MR. CANNARELLA: That may be correct in the
10 future, but is there mitigation for existing such as old
11 dumps? Is there any mitigation for that?

12 COL HARRIS: Yes.

13 M11

14 MR. CANNARELLA: Another question. Your
15 desalinization plant that you propose will enable you to
16 address issues of water quality. On page 3-166 your Draft
17 EIS mentions there may be leaking tanks that are
18 contaminating groundwater. Do you plan remedial action on
19 that location or are you just going to...

20 COL HARRIS: We have no indication at this time
21 that any of our tanks are leaking. We have had water
22 samples taken, and we have found no hydrocarbons within our
23 water sources. We identified this because we have not had
24 a survey taken in the vicinity of the fuel farm, recently.
25 So it was indicated that we possibly had leakers. We have
a study team, and correct me if I'm wrong...

LTC HARRIS: That's in the fiscal year '90 to

M10

The landfills known to exist are located on Roi-Namur, Kwajalein, and Meck Islands. Mitigation efforts for these sites are described in the DEIS, Subsection 4.12.3, pages 4-73 to 4-75, and include implementation of an improved waste management program, lens well monitoring, and cleanup of the localized areas of contamination created by USAKA activities. The lens well monitoring will help identify locations of any additional old landfill sites or other problem areas. Mitigation efforts for any unknown landfill sites discovered during monitoring efforts will be addressed on a case-by-case basis. See also revised Subsection 4.12.3.1 in Chapter 4 of this volume.

M11

Petroleum hydrocarbons have been observed on the water table in the vicinity of Power Plants 1 and 1A. Recent testing of the lens wells did not indicate the presence of petroleum hydrocarbons, although traces of organic hydrocarbons were found (see revised Subsection 3.3.1 in Chapter 4 of this volume). To reduce the risk of contamination of the drinking water system and to identify the source of these petroleum hydrocarbons, a periodic monitoring program is being developed that will include analysis for this constituent and further lens well testing in planned in the immediate area of Power Plants 1 and 1A.

survey team.

COL HARRIS: We are going to start monthly tests
then in FY 80 we have a planned study to
survey the fuel farm area and our tanks.

MR. CANNARELLA: But you don't feel there is
contamination now?

COL HARRIS: We have had water samples taken, and
there are no hydrocarbons identified in those waters.

MR. CANNARELLA: I quote, page 3-166, "USAKA
engineering personnel reported that a layer of hydrocarbon
was observed floating on the water table at Kwajalein in an
excavation near Power Plant 1A. This observation lends
evidence to the potential of leaking tanks and/or the lack
of containment." Maybe you might want to check that area.

COL HARRIS: We have checked, and what we believe
was that the contractor either greased his excavator or
something. But we have had physical checks of our water
and no hydrocarbons have been determined.

MR. CANNARELLA: So I would assume that one
component of the water quality program will be maintenance
of the groundwater quality whether or not you tend to use
it.

COL HARRIS: Absolutely.

MR. CAPELLE: I notice in the map, I was happy to
see more traditional names put in there. I would like to

Majuro, RMI Public Hearing, 13 July 1989

Page 24

M12 See the response to comment M11 and revised Subsection 3.3.1
in Chapter 4 of this volume.

M13 Contractor activities are a possible source of the contami-
nation; however, all potential sources, both above and below
ground, are being investigated. See the response to com-
ment M11 and revised Subsection 3.3.1 in Chapter 4 of this
volume.

M14 No additional response is needed.

M15 The U.S. Army appreciates the concern for the preservation
of the Marshallese language and traditional Marshallese
place names. As reported in the correspondence shown in the
appendix to this document, the army requested the assistance
of Mr. Capelle and the Alele Museum in checking the accuracy
of the traditional spellings used in the DEIS. Mr. Capelle
responded with a list of preferred spellings, which has been
used to modify the DEIS (see Chapter 4 of this volume). In
addition, the Army has requested the assistance of
Mr. Capelle in translating the summary of the DEIS into Mar-
shallese. When the translation is complete, it will be dis-
tributed to those who attended the hearings at Ebeye and
Majuro, as well as to local libraries.

M15
Cont.

1 ask that if you could put more of those names in there and
2 give them the right spelling, and maybe we could help you
3 out on that.

4 COL HARRIS: We would appreciate your assistance.
5 If you could identify which names for the final EIS then
6 maybe we can put the correct names in there.

7 MR. CAPELLE: Yes, I can.

8 COL HARRIS: Perhaps, Major Moore can coordinate
9 with Mr. Capelle and forward any of the names that we may
10 have misspelled.

11 MAJ MOORE: Yes, sir.

12 COL HARRIS: Yes, ma'am.

13 MS. HARDING: My name is Elizabeth Harding. I am
14 legal counsel to the RMI Environmental Protection
15 Authority. I have a question about the Compact

16 environmental requirement. The environmental protection
17 requirement is Section 161 of the Compact. Section 161.84,
18 there is a requirement for the government of the United
19 States to develop--prior to conducting any activities
20 requiring preparation of an EIS--to develop appropriate
21 mechanisms to regulate to our Marshallese standards, to
22 development the appropriate standards as set forth in the
23 Compact. I understand that those regulations have not yet
24 been developed, and I am wondering whether under what
25 regulations the government plans to conduct the

Majuro, RMI Public Hearing, 13 July 1989

Page 25

M16

The Compact of Free Association establishes a three-tiered process for the protection of the environment of the Marshall Islands regarding United States activities.

First, under Section 161(a)(1) of the Compact, the environmental controls that were in effect on the day prior to the effective date of the Compact (October 20, 1986) continue in effect for ongoing activities. Thus, environmental controls contained in the United States laws and regulations that applied to United States activities at that time continue in effect.

Second, under Section 161(a)(3) of the Compact, for those United States activities that require the preparation of an EIS, the United States also shall comply with standards similar to those contained in the following U.S. statutes will apply (taking into account the particular environment of the Marshall Islands):

- Endangered Species Act
- Clean Air Act
- Clean Water Act
- Ocean Dumping Act
- Toxic Substances Control Act
- Resources Conservation and Recovery Act (RCRA)

There are judicially reviewable standards that are already in effect under these six named statutes that can be applied to the new activities at USAKA. The application of these standards must take into account the particular environment of the Marshall Islands and must reflect the comments of the Government of the Marshall Islands.

Third, the Compact provides for the development of judicially reviewable standards and procedures to regulate the activities of the United States that require the preparation of an EIS. There is an ongoing effort to develop a new set of regulations that is specifically tailored to the environment of the Marshall Islands. This is a joint effort among the U.S. Environmental Protection Agency, the U.S. Department of State, and the Department of Defense. Until this effort is complete, the U.S. Army considers the current U.S. environmental standards under the six named statutes as the substantially similar standards applicable to USAKA activities requiring the preparation of an EIS.

M16
Cont. activities.

Will you be looking to the Marshall Islands for those regulations or going to the United States?

COL HARRIS: I will defer to my counsel here.

LTC VAN ZANDT: The way that the Compact is set up is sort of a three-tiered process here. We have the environmental controls under the first provision, 161, that were in effect the day before the Compact took effect.

Those laws and regulations that would apply in the United States at that time will continue in effect and, of course, are legal and enforceable on the activities.

In addition, under the third provision of Section 161, when you write an EIS or do an activity, there are six named statutes that would come into effect and apply to those activities. So we read that to mean they are legally enforceable regulations that are already in place from the United States Environmental Protection Agency that would apply, under those six statutes, to the new activities, and then recognizing that, you have the ongoing process of developing the new regulations that will continue over some time and, of course, the consultation that we will have with the Republic.

M17 MS. HARDING: As a followup, I understand Section 161 that those standards are similar. Do you read that language to read that you must comply with all United

M17 See the response to comment M16.

M17
Cont.

1 States regulations?

2 LTC VAN ZANDT: Under the six named statutes,
3 if we had nothing to substitute under the fourth
4 provision.

5 MS. HARDING: Right.

6 LTC VAN ZANDT: The only substantive and similar
7 standards that we have are those which are in effect, until
8 we have other regulations promulgated.

9 MS. HARDING: All right.

10 COL HARRIS: Yes, sir.

11 MR. STRAUSS: Awhile ago there was something on
12 the screen about Omelek, and I believe that there was
13 something about that Harbert was going to dredge some of
14 the coral area and it was going to be mitigated by such and
15 such process. Aren't they already doing that dredging now?

16 COL HARRIS: No. It's not anticipated that
17 anything will take place on Omelek until 1992. If we have
18 to expand the harbor, it is not in the area of the coral,
19 but we suspect that silt from a dredging operation may
20 float over and damage the coral but the result will be to
21 put up a silt screen.

22 MR. STRAUSS: I'm sorry, I thought you said
23 Harbert.

24 COL HARRIS: No, harbor. Not Harbert the company
25 but harbor port.

Dredging at Omelek has not yet begun. If it is required, it is not anticipated to begin until 1992. The EIS identified the possibility that damage to surrounding coral beds could occur as the result of silt from dredging. Subsection 4.6.4 (page 4-37) of the DEIS recommends a silt curtain or other appropriate silt control measures as mitigation if this dredging is performed.

M18

1 M19

MR. STRAUSS: My last comment is I don't know whether this is a proper comment or not when you are talking about the environment but are economic and sociological consequences, are those considered?

COL HARRIS: Yes.

2 M20

MR. STRAUSS: I guess my question is, is there a plan or has there been since the last hearing that we had, was there any prediction made as to, like, how many Marshallese businesses would be allowed to do construction for all the new construction that was planned, and was there ever any prediction made on that, like, the Marshallese stood to get so much of the business, and if there was a prediction made was it surpassed, was it bad, or did it come in less than the prediction, and is there going to be a prediction of all of this new construction, or is anything going to be set aside for any Marshallese companies to get in a fair bid?

COL HARRIS: There is no prediction made nor was there any specific amount being set aside for Marshallese firms. Marshallese firms have the ability to bid on those projects. Currently, Harbert International has a three-year contract with the Corps of Engineers for all of the Corps' major work at Kwajalein. But some of the construction will take place after that. Also Harbert, of course, is free to subcontract to the Marshallese, if they

M19

Economic and sociological consequences of the proposed actions at USAKA were taken into consideration during the preparation of the EIS (see Sections 3.10 and 4.10 of the DEIS).

M20

No predictions have been made of the number of Marshallese businesses involved in the work at USAKA. Marshallese businesses are encouraged to bid on any construction contracts issued at USAKA. USAKA continues to work with the RMI government to explain the process and procedures for Marshallese businesses to bid on contracts and subcontracts.

1 care to.

M21

MR. STRAUSS: Is there any statistics--how long has Harbert been there, for instance; three years, two years?

COL HARRIS: No.

MR. STRAUSS: Do you happen to know, about a year or more?

COL HARRIS: I think they have been there about a year.

M22

MR. STRAUSS: Do you have any of those statistics out there, like, do the subcontractors give out, like, what percentage went to Marshallese companies? Does anyone know that?

COL HARRIS: I don't know that.

MR. STRAUSS: All right.

COL HARRIS: Is there any other comments?

Yes, sir.

M23

MR. OGDEN: I have a question regarding whether or not any consideration of possible sea level rise has been taken into consideration in your Draft Environmental Impact Statement?

COL HARRIS: To the best of my knowledge, no.

There is no action that will be taking place on USAKA that results in sea-level rise.

MR. OGDEN: Why? It's become quite a topic of

M21

Harbert International has been prime construction contractor at USAKA since January 1988.

M22

Although USAKA encourages contractors to use Marshallese subcontractors, records have not been maintained on the percentage of work that has gone to Marshallese subcontractors. However, since 1986, the only known subcontractor for a construction prime contractor was in fact a Marshallese firm, which was hired by Morrison-Knudson, Inc., for the site preparation work for the housing construction project that was completed in 1989.

M23

See Subsection 4.4.1.2 of the DEIS for a discussion of potential upper atmosphere or global climate effects of the Proposed Action.

M23

Cont.

1 debate in international circles. I am wondering why it
2 hasn't been given any consideration, possible sea level
3 rise.

4 MR. LINEHAN: Probably the only potential action
5 that would, perhaps, lead to some change in the sea level
6 rising associated with the greenhouse affect would be the
7 rocket launches. There was a look at that and it was
8 compared to some modeling that had been done and the
9 conclusion was that the amounts of combustion products and
10 emissions are so minute that there is no predictable affect
11 on long-term climatic changes or upper atmospheric changes.
12 It is very small compared to the volume of air and the
13 emissions are very short-term.

14 COL HARRIS: Yes, sir.

M24

15 MR. OGDEN: Has the issue of potential sea-level
16 rise on Kwajalein--are you incorporating that into your
17 planning, your long-range planning?

18 COL HARRIS: As part of our long-range plan, our
19 master plan, we have shoreline protection projects
20 identified, but that is outside the EIS and is not
21 addressed in any EIS. That is our plan for shoreline
22 protection of the various facilities that we have.

23 I cannot tell you right off the top of my head. I
24 don't believe that any of those shoreline projects
25 specifically address rising water. They address existing

M24
Cont.

difficulties that we have with the water at the level that it is right now.

MR. OGDEN: So it was not considered in environmental issues or other water issues in planning facilities?

COL HARRIS: No.

LTC HARRIS: The length of time that an EIS looks at is not measured in tens of years but in relation to a few years.

COL HARRIS: Any other comments?

I would like to thank each you for participating this evening and providing your comments. We remind you that the comment period is open through 7 August, and we will accept comments through that time, and all the comments will be addressed in the final EIS.

If you care to receive a copy of the final EIS, again, please so note and give us your address.

Any other comments? Thank you very much ladies and gentlemen.

(Whereupon, the public meeting was concluded at 8:50 p.m.)

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Comment Sheet

DRAFT ENVIRONMENTAL IMPACT STATEMENT
Proposed Actions at U.S. Army Kwajalein Atoll

You may use this sheet to make your comments on the Draft Environmental Impact Statement for Proposed Actions at U.S. Army Kwajalein Atoll.

1. Please include source of comments, date, and name of person making comment.

2. Please have comments translated to Marshallese to give the local population a chance to participate in the process.

3. Aloa Museum is willing to help in Marshallese preservation.

Please give your name: Alfred Capelle

Address: P.O. Box 821

Marjara Marshalle Islands 96960

Affiliation (if any):

Note: Written comments may also be sent to:

Commander, U.S. Army Kwajalein Atoll
Attn: CSSD-KI
Post Office Box 26
APO San Francisco 96555-2526

Do you want a copy of the Final Environmental Impact Statement?

[] Yes [] No

M25 See responses to comments M5 and M15.

M26 See responses to comments M5 and M15.

M27 See responses to comments M5 and M15.

C E R T I F I C A T E

STATE OF WASHINGTON)
) ss.
COUNTY OF KING)

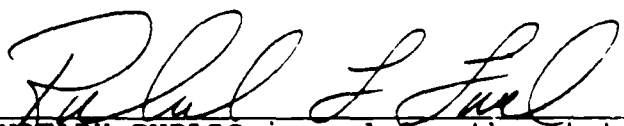
I, the undersigned Notary Public in and for the State of Washington, do hereby certify:

That the annexed transcript of the July 13, 1989, Public Hearing was taken stenographically by me and reduced to typewriting under my direction.

I further certify that I am not a relative or employee or attorney or counsel of any of the parties to said action, or a relative or employee of any such attorney or counsel, and that I am not financially interested in the said action or the outcome thereof;

I further certify that the annexed July 13, 1989 Public Hearing is a full, true and correct transcript, including all objections, motions and exceptions of counsel, made and taken at the time of the foregoing proceedings.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 23 day of August, 1989.



NOTARY PUBLIC in and for the state
of Washington, residing at Seattle.
My Appointment Expires August 17, 1991

CERTIFICATE

2.2 TRANSCRIPT OF PROCEEDINGS
PUBLIC HEARING AT EBEYE

PUBLIC HEARING

Draft Environmental Impact Statement
Proposed Action at
U.S. Army Kwajalein Atoll

CH2M HILL

Transcript of Proceedings

BE IT REMEMBERED, that a public hearing in the above matter was held at the Republic of the Marshall Islands School House, Ebeye Island, Marshall Islands at 7:00 p.m. on Thursday, July 13, 1989, before COL Philip Harris, LTC Charles Harris, LTC Ron Keglovits, LTC Michael Van Zandt, Raleigh Sakado and Andrew Linehan.

WHEREUPON, the following proceedings were had,
to wit:

Richard L. Lind
Court Reporter

1 (Whereupon, the same presentation given by
2 COL Harris and LTC Harris on Majuro
3 was repeated for the presentation on Ebeye)

4 P U B L I C C O M M E N T S

5
6 COL HARRIS: Okay, we will now reconvene. I
7 would ask that you identify yourself so that our reporter
8 can get your name and make sure that we are able then to
9 adequately address your comment, as appropriate, in the
10 final EIS.

11 Do we have anyone who cares to comment? Yes, sir.

12 MR. JUNG: Richard Jung. As I understand it, the
13 proposed safety standards for radiation of the GBR is six
14 minutes at 4 microwatts per centimeters squared, which is
15 the estimate of the main lobe through the Kwajalein area.

16 What safeguards are there to ensure that that time
17 limit will be met? Are there any safeguards?

18 COL HARRIS: Yes. The program manager has
19 recently conducted a major study with one of its
20 contractors to verify that the safeguards are being met.
21 One of the things that they are doing, for example, is they
22 are putting safeguards so that it cannot be depressed below
23 two degrees. They are putting sensors on the island in
24 areas to determine if there are any effects, et cetera. So
25 there are a number of safeguards being met.

Ebeye, RMI Public Hearing, 13 July 1989

Page 1

E1

The radiation safety standards adopted for GBR testing follow the recommendations of the American National Standards Institute as reflected in U.S. Army Technical Guide No. 153 (Guidelines for Controlling Potential Health Hazards from Radio Frequency Radiation). The electromagnetic radiation power density of 5 milliwatts per square centimeter (mW/cm²) averaged over a 6-minute period is the maximum level allowed for individuals from exposure to any radar, including any element of GBR radiation (main beam, side lobes, or grating lobes).

Controls to ensure that no one is exposed to radiation from the GBR-X radar in excess of acceptable levels are described in Subsection 4.15.2 of the DEIS.

The additional study of the GBR-X mentioned by COL Harris is a review of the application of ANSI and Army regulations governing radio frequency radiation exposure to the GBR-X program. This study (currently under way) is part of the continuing review process of the proposed GBR-X test program.

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The commanding general of SDC just last week, in fact, directed the program manager to get an additional firm, a totally separate branch, to again look at it to make sure. Any other comments? All right.

I would remind you that should you have a comment to make, the period for public comment remains open through the 7th of August at the address shown there in your handout. Please feel free to make a comment. Any comments will be addressed in the final EIS, and you will receive a copy of the same.

All right. Does anyone else care to make a comment concerning the EIS? Yes, sir.

MR. JEADRIK: Abon Jeadrik. You were saying something about the danger of drinking water in this well. Can you be more specific on that?

COL HARRIS: Yes. During the dry seasons, we pump a good deal of water from our lens wells. The danger is that we would pump enough water that our wells would be contaminated with salt from sea water. We could reduce the fresh water perceptibly enough that sea water would contaminate the well.

MR. JEADRIK: That would go to all the islands?

COL HARRIS: No, just Kwajalein Island itself.

We also had some concern that there may be some other contamination as a result of solid waste handling. We

E2 See revised Subsection 3.3.1 in Chapter 4 of this volume.

E3 See revised Subsection 3.3.1 in Chapter 4 of this volume.

1 have had all of our water tested by an independent firm
2 here within the last three weeks, as LTC Harris mentioned,
3 and no hydrocarbons at all were found in the water.

4 Do any other individuals care to comment? If there
5 are no others, I personally thank all of you for attending
6 tonight and showing an interest in the EIS. The meeting is
7 hereby adjourned. Thank you very much.

8 (Whereupon, the public meeting was
9 adjourned at 8:10 p.m.)

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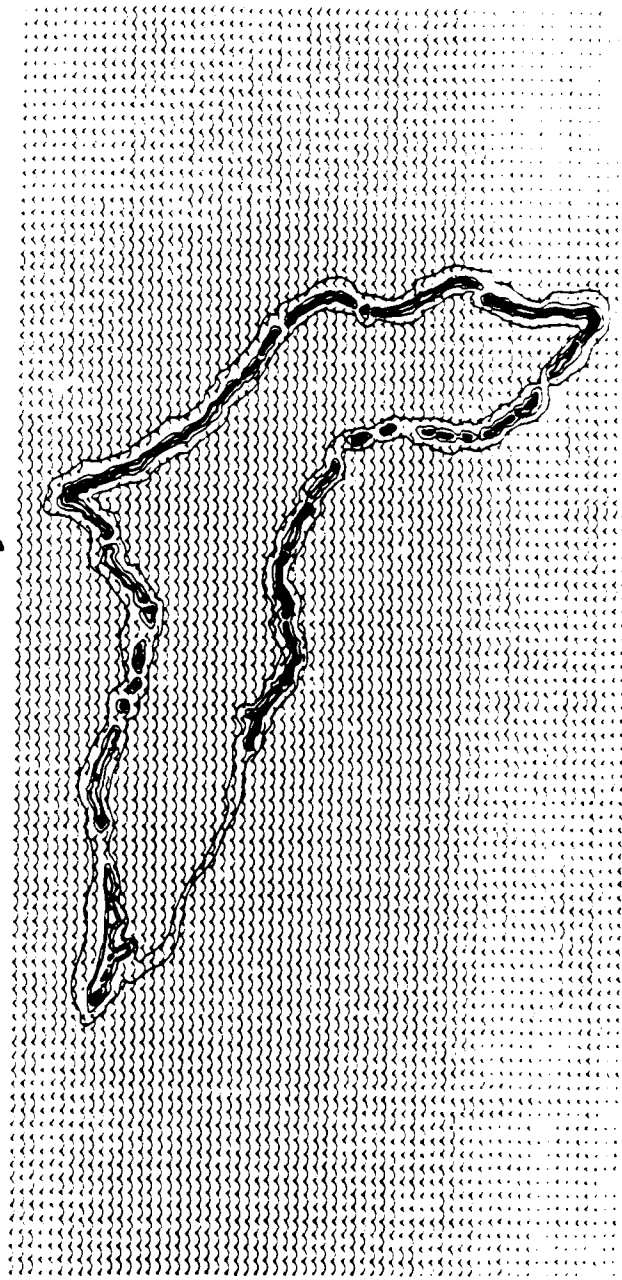
2.3 GRAPHIC PRESENTATION FOR PUBLIC HEARINGS

Copies of overhead transparencies that were used in the public hearings are reproduced on the following pages.



Public Hearing

Draft Environmental Impact Statement for Proposed Actions at U.S. ARMY KWAJALEIN ATOLL



U.S. Army Strategic Defense Command



Agenda

Presentation

- Introduction
 - The role of USAKA-- "What goes on there?"
 - The purpose of the public hearing
 - How you can participate
- What are the "Proposed Actions"?
- How will the proposed actions affect the environment?

15-minute Break

- During this period you may wish to write your comments on the blue sheet in your information packet

Public Hearing

- USAKA welcomes your comments and questions about this Draft Environmental Impact Statement



Send your Comments to:



Commander, U.S. Army Kwajalein Atoll
Attn: CSSD-KX
P.O. Box 26
APO San Francisco 96555-2526

Comments should be received by August 7



National Environmental Policy Act Process for Environmental Impact Statements



- 1. Scoping Meetings**
- 2. Draft Environmental Impact Statement**
- 3. Public Comment Period and Public Hearings**
- 4. Final Environmental Impact Statement**
- 5. Waiting Period**
- 6. Record of Decision**



Proposed Action

On-going

USAKA Programs

Plus

SDI Testing

Plus

Non-SDI Testing



Proposed SDI Testing at USAKA



- ERIS
- HEDI
- SBI
- GSTS
- GBR-X
- AOA
- Seven other related SDI Test Activities



Related Actions

- Desalination Plant, Kwajalein Island
- Sewage Treatment Plant,
Roi-Namur Island
- Document Control Facility,
Roi-Namur Island
- Family Housing (130 units),
Kwajalein Island
- Unaccompanied Personnel Housing,
Kwajalein Island



Alternatives



- **No-Action: Continuation of current mission activities and related support**
- **Proposed Action: On-going activities plus SDI testing on the preferred schedule**
- **Change of Duration Alternative: HEDI testing delayed 5 years; GBR-X testing delayed 2 years**



Significant Negative Impacts



ENVIRONMENTAL RESOURCE	CONCERNS	MITIGATION
Groundwater	Overpumping of Groundwater Lens	FY90 Freshwater Plant, Kwajalein
Marine Water	Sewage/Solid and Hazardous Waste	FY90 Sewage Treatment Plant Roi-Namur Waste Management Improvements
Air Quality	Solid Waste-Burning Power Plants Air Pollution	Incinerator Monitoring
Rare, Threatened, or Endangered Species	Giant Clams	USAKA Regulation



Significant Negative Impacts

ENVIRONMENTAL RESOURCE	CONCERNS	MITIGATION
USAKA Housing	Overcrowding	UPH Facilities, Kwajalein 130 Family Housing Units, Kwajalein
Water Supply	Overpumping groundwater lens	FY90 Freshwater Plant, Kwajalein
Wastewater	Discharge at Kwajalein Discharge at Roi-Namur	Clarifier FY90 Sewage Treatment Plant
Solid Waste	Solid Waste Management Practices	Incinerator Improvements to Landfill
Hazardous Materials/ Waste	PCB & Asbestos Storage	PCB Storage Facility Proper Disposal



Significant Negative Impacts (PROPOSED ACTION/SDI ACTIVITIES)

ENVIRONMENTAL RESOURCE	CONCERN	MITIGATION
Island Plants	Native Trees, Omelek	Site Adaptation
Marine Biological Resources	Fill and Dredging, Omelek	Silt Control Measures
Archaeological Resources	Archaeological Site, Omelek	Site Adaptation and Preconstruction Sampling

ACRONYMS

USAKA	U.S. ARMY KWAJALEIN ATOLL
SDC	STRATEGIC DEFENSE COMMAND
SDI	STRATEGIC DEFENSE INITIATIVE
EIS	ENVIRONMENTAL IMPACT STATEMENT
ERIS	EXOATMOSPHERIC REENTRY VEHICLE INTERCEPTOR SYSTEM
HEDI	HIGH ENDOATMOSPHERIC DEFENSE INTERCEPTOR
SBI	SPACE-BASED INTERCEPTOR
GSTS	GROUND-BASED SURVEILLANCE AND TRACKING SYSTEM
GBR-X	GROUND-BASED RADAR-EXPERIMENTAL
AOA	AIRBORNE OPTICAL ADJUNCT

Chapter 3 COMMENT LETTERS AND RESPONSES

This chapter contains written comments received on the DEIS and responses to those comments. Each comment within each letter has been assigned a number (printed in the margin of the letter) to assist in identifying the comment with the appropriate response. The first letter and numeral combination identifies the letter, while the second numeral distinguishes multiple comments within a single letter. For example, L2.3 indicates the third comment in the second letter received. Letters that have been photocopied and reduced are on the the left half of each page and responses are printed on the right half of each page.



United States Department of the Interior

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813



L1

July 20, 1989

U S Army Strategic Defense Command
Attention: CSSD-H-SSP (LTC Ronald A. Keglavits)
P O Box 1500
Huntsville, Alabama 35807-3801

Subject: "Proposed Actions at U.S. Army Kwajalein Atoll", Draft
Environmental Impact Statement, U.S. Army Strategic Defense
Command, June 1989

Dear Sir:

Thank you for the opportunity to review the subject Draft Environmental
Impact Statement.

Our staff has reviewed the DEIS with particular attention to aspects
regarding water supply and environmental contamination. The reviewers were
Charles D. Hunt, Jr. and Stephen S. Anthony, ground-water hydrologists.

We offer several comments that appear on the following pages.

Sincerely,

Stephen S. Anthony
for
William Meyer
District Chief

Review comments by U.S. Geological Survey, Honolulu, Hawaii
on Draft Environmental Impact Statement.
"Proposed Actions at U.S. Army Kwajalein Atoll"

COMMENTS:

1. Page 3-34, par. 2: "The presence of hydrocarbons (e.g. diesel fuel) was reportedly observed in a foundation excavation ... in the vicinity of the Power Plant 1 fuel tank farm."

Page 3-166, par. 5: "... coral and asphalt-line coral floors are not impervious enough to contain releases, and the concrete floors have numerous cracks and gaps. USAKA engineering personnel reported that a layer of hydrocarbon was observed floating on the water table at Kwajalein in an excavation near Power Plant 1A."

L1.1

Comment: We suggest that ground contamination by fuels should be of some concern because of the threat posed to potable ground water. Although the precise location of the fuel contamination is not given, it is notable that lens wells No. 2 and No. 5 and portions of new well No. 8 are located within several hundred feet of both the fuel tank farm and Power Plant 1A. It could be possible for fuel contaminants to make their way to the wells, either as floating fuel or, more likely, in dissolved aqueous phase. This may or may not hold serious consequences, depending on the concentration of contaminants reaching the wells and the extent to which water from them is diluted by mixing with water from other wells or from the catchment. Further consideration of this potential problem would be advisable, however.

2. Page 4-4, par. 3: "Variations in chloride concentration, especially those exceeding normal concentrations (15 to 40 mg/L as chloride), indicate overpumping of the groundwater lens ..."

Page 4-5, par. 4: "Increases in the chloride level are indicative of overpumping and upconing of saltwater from the subsurface."

L1.2

Comment: Increases in the chloride concentration of pumped water do not necessarily indicate overpumping. Progressive and substantial increases in chloride concentration should, to a large degree, be expected as part of the normal operation and management of the water production system. Because of the strongly seasonal distribution of rainfall on Kwajalein, the freshwater lenses undergo natural shrinkage during dry months and expansion during wet months. As the dry season progresses, the chloride concentration of pumped ground water will increase progressively and this should be viewed as a normal circumstance. Chloride concentrations typically rise to 100 or 150 mg/L (milligrams per liter) in at least several of the wells during normal dry seasons, and may reach or exceed the potable limit of 250 mg/L during pronounced dry seasons or other drought conditions. The rising trend reverses with the arrival of wet season rains that replenish the freshwater lenses. The impacts of drought can be lessened by augmenting the supply with desalination capability (as proposed) and/or by installing additional wells in underdeveloped portions of the aquifer, which will increase the sustainable yield by further spreading out the pumpage areally.

L1.1

This comment is noted. See the response to comment M11 for a discussion of results of recent additional testing that did not confirm the presence of petroleum hydrocarbons in the lens wells. However, petroleum hydrocarbons have been reported floating on the groundwater in the vicinity of Power Plant 1. Further investigation has been initiated by monthly sampling and analysis for these contaminants and by the programmed FY90 survey of the fuel farm.

L1.2

Comment noted. See revised Subsections 3.3.1 and 4.3.1.2 in Chapter 4 of this volume.

Page 4-5, par. 6: "During drought conditions, ... (continued pumping in excess of the allowable sustained yield) ... could cause long-term degradation of the groundwater ..."

L1.3

L1.3 Comment noted. See revised Subsections 3.3.1 and 4.3.1.2 in Chapter 4 of this volume.

Comment: Actually, degradation of ground water that occurs during a drought tends to be reversed quickly, typically with the onset of the next wet season. The effects of multi-year droughts would be longer lasting, though primarily due to lack of rainfall and natural ground-water discharge rather than overpumping. Records kept by the water system operators on Kwajalein show a fairly rapid recovery of the ground-water system following the most serious recent drought. During the 1984 drought, chloride concentrations in production wells exceeded 150 mg/L from May to July but decreased rapidly to 20-80 mg/L by September with the resumption of wet season rains and remained below 100 mg/L throughout 1985 to 1987. Again, because of the strongly seasonal occurrence of rainfall and hydrogeologic characteristics typical of atolls, the ground-water system is fairly resilient and has little long-term (multiyear) "memory", although it does undergo fairly rapid depletion in the absence of rain.

Nevertheless, supplemental production capacity (as from desalination) would provide additional flexibility in regular management and in management of rare contingencies such as the storm-related overwash of salt water that occurred in January 1988 and rendered the wells inoperable for several months due to high salinity.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX
215 Fremont Street
San Francisco Ca 94106

L2

04 AUG 1989

LTC Ronald A. Keglovits
U.S. Army Strategic Defense Command
Attention: CSSD-H-SSP
P.O. Box 1500
Huntsville, Alabama 35807-3801

Dear LTC Keglovits:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) entitled PROPOSED ACTIONS AT U.S. ARMY KWAJALEIN ATOLL under authority of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Additional comments are enclosed.

The U.S. Army is proposing to install and test sensing/tracking equipment and interceptor missile systems at the U.S. Army Kwajalein Atoll (USAKA), Republic of the Marshall Islands (RMI), that would primarily support research, development, and evaluation activities related to the Strategic Defense Initiative (SDI). The DEIS does a commendable job of disclosing USAKA's existing environmental problems, identifying the adverse incremental impacts of the proposed project, and recommending mitigation measures to offset existing and potential environmental damage.

Although the U.S. has not formally adopted procedures to implement Section 161(a) of the Compact of Free Association (P.L. 99-239), the Final EIS (FEIS) should detail the regulatory regime under which the proposed project would be implemented. USAKA must guarantee that activities associated with the proposed project's implementation are subject to procedures that ensure substantive conformance with applicable EPA-administered environmental statutes. We are interested in working with USAKA to develop and execute individual Memoranda of Understanding (MOU) that detail the criteria and conditions under which each implementation activity, or category of activities, may proceed. The MOUs should also clarify measures to avoid potential adverse environmental impacts, and to ensure that any necessary mitigation measures achieve substantive conformance with applicable U.S. standards.

L2.1

L2.2

Based on the findings of the DEIS, a mitigation plan is being developed that, when implemented, will bring USAKA into full compliance with applicable U.S. environmental laws. The U.S. Army Strategic Defense Command is committed firmly to this objective. The mitigation plan will become part of the process for the Record of Decision. The Army will seek technical input from the U.S. Environmental Protection Agency on the mitigation plan. Please see also the response to comment M16 regarding the regulatory regime under which the Proposed Action would be implemented.

L2.1

As indicated in revisions to Section 1.4 of the DEIS (in Chapter 4 of this volume), USAKA is engaged in the development of specific standards to address the environmental issues applicable to USAKA in conjunction with the U.S. Army Corps of Engineers, the U.S. Department of State, and the U.S. Environmental Protection Agency, Region IX. With the adoption of appropriate mitigations and the finalization of the specific standards, the Army believes that full compliance with the applicable U.S. environmental standards will be achieved. Adoption of these standards will be accomplished in consultation with the Government of the Republic of the Marshall Islands.

L2.2

Currently, the U.S. Army is handling solid waste and hazardous materials in a manner not consistent with the Clean Air Act, the Resource Conservation and Recovery Act (RCRA), nor the Clean Water Act (DEIS, 4-10 to 4-21, 4-71 to 4-78). For example:

1. Each year, a neutralized solution from an estimated 650 lead-acid batteries is discharged into a sanitary sewer, disposed into a landfill, or left to evaporate.
2. Sandblasting activities lack controls to prevent the spread of paint and metal constituents into the sensitive marine environment.
3. Waste oil and solvents are collected in unlined bermed pits and either evaporated or periodically ignited (openly burned). Contaminated water is siphoned from the bottom of the pits and drained along an unlined path into the ocean. Soils in these areas suggest potential groundwater contamination (DEIS 165, 168).

L2.3 The DEIS does not explain whether the U.S. Army is committed to bringing USARA into substantive compliance with U.S. environmental laws, nor does it describe the mechanisms through which substantive compliance would be achieved. Without such a commitment, we are concerned that the proposed project may significantly exacerbate existing adverse environmental conditions resulting from ongoing USARA operations. Accordingly, we have classified the DEIS as Category MO-2, Environmental Objections--Insufficient Information (see enclosed "Summary of Rating Definitions and Follow-up Actions").

We appreciate the opportunity to review this DEIS. Please send three copies of the DEIS to this office when you submit the documents to EPA Headquarters. If you have any concerns or questions, please call me at (FTS) 454-8083, or contact Norman Lovelace of my staff at (FTS) 454-7431.

Sincerely,

Deanna M. Wieman
for Deanna M. Wieman, Director
Office of External Affairs

Enclosures: (five pages)

L2.3 See the response to comment L2.1.

SOLID/HAZARDOUS/TOXIC WASTE

- L2.4** 1. In general, USAKA does not comply with the substantive standards under the Resource Conservation and Recovery Act (RCRA) and the Toxic Substances Control Act (TSCA).
- L2.5** a. USAKA and EPA should develop an MOU to govern solid, hazardous, and toxic waste in a manner that meets the applicable standards.
- L2.6** 2. The FEIS should describe, evaluate, and commit to a program of waste minimization and recycling to mitigate the current practice of waste disposal and/or exportation. This program should be embodied in an MOU.
- L2.7** 3. USAKA and EPA have entered into an MOU to govern the ocean disposal of certain bulky, metallic construction waste.

AIR QUALITY

1. The DEIS discloses that the proposed project will either exacerbate or cause exceedances of the National Ambient Air Quality Standards (NAAQS) for NO_x, PM₁₀, and CO (DEIS, p. 4-14,15).

- L2.8** a. Inasmuch as NAAQS are primary health standards, USAKA should commit to an air quality mitigation program before construction of power plant 1A.
- L2.9** b. USAKA and EPA should develop an MOU that would govern emissions of air pollutants at USAKA and ensure achievement of NAAQS and any applicable NESHAPS.

WATER QUALITY

- L2.10** 1. The FEIS should more fully discuss the proposed project's potential to adversely affect groundwater resources via storage and disposal of hazardous materials. Particular attention should be paid to possible adverse effects on any existing or potential drinking water sources.
- L2.11** 2. The FEIS should ensure that the monitoring of potable water is at least in conformance with the National Primary Drinking Water Standards. The DEIS does not make this clear.

L2.4 The DEIS reveals hazardous and solid waste management practices and toxic substance handling procedures that are not consistent with the standards applicable in the United States. The DEIS proposes mitigations that will adequately address these issues. Currently, USAKA is developing procedures to correct these deficiencies, and it has contracted with GMP Associates to finalize a waste management plan for implementation at USAKA.

L2.5 See the response to comment L2.2.

L2.6 The waste management study prepared by GMP Associates and summarized in Subsections 4.12.3 and 4.12.4 of the DEIS provides the basis for a program of improved waste management practices, including waste minimization and recycling. The mitigation proposed in the DEIS will be considered in preparing the Record of Decision for the Proposed Action. See also the response to comment L2.2.

L2.7 See revised Subsection 3.12.3.1 in Chapter 4 of this volume.

L2.8 The Record of Decision will include appropriate air quality mitigation measures for Power Plant 1A. USAKA also plans to seek EPA review of Power Plant 1A. Within the context of the Compact, the Prevention of Significant Deterioration (PSD) increments and National Ambient Air Quality Standards will be applied.

L2.9 See the response to comment L2.2.

L2.10 See revised Subsections 3.12.4.1 and 4.12.4.1 in Chapter 4 of this volume.

L2.11 As indicated in revised Subsection 3.12.1.1 in Chapter 4 of this volume, USAKA has implemented a program to meet the potable water monitoring requirements of the National Primary Drinking Water Standards.

3. Although the proposed desalinization plant at Kwajalein will decrease demand for groundwater, there may be periods when groundwater is heavily extracted for potable water.

L2.12 a. The FEIS should establish a groundwater monitoring program to guide groundwater extraction rates.

L2.13 b. The FEIS should discuss the proposed project's method of disposing of brine generated by the proposed desalinization plant.

L2.14 4. An MOU between USARA and EPA should be developed to address the potential adverse environmental effects resulting from thermal discharges from the proposed power-generating facilities at Kwajalein and Roi-Namur.

L2.15 5. The FEIS should address any existing or potential nondomestic sources of wastewater entering the sewage systems at Kwajalein and Roi-Namur, and commit to measures that will prevent releases of hazardous materials into the wastewater systems.

L2.16 6. The proposed mitigation measure to conduct more comprehensive monitoring to address solid waste disposal impacts on marine water quality may serve only to document, rather than offset, these adverse impacts (DEIS, p. 4-10).

a. The proposed MOU (re: our comment on solid/hazardous/toxic waste) and FEIS should commit to a rigorous program of solid waste management, as well as providing a monitoring program to evaluate the program's effectiveness vis a vis marine water quality.

L2.17 7. An MOU between USARA, the Army Corps of Engineers, and EPA should be prepared to govern all proposed quarrying, dredging, and filling activities (e.g. Meck Harbor). It is important that the MOU reflects the substantive standards of Section 404 of the Clean Water Act, specifies the avoidance of biologically significant areas, and minimizes adverse turbidity impacts.

L2.12 Lens well monitoring has been implemented as mitigation for the potential overpumping of the groundwater system. Proposed construction of a desalination plant will also reduce the potential for overpumping. Final decisions about mitigation will be reflected in the Record of Decision. See also the comments about groundwater by USGS (letter L1) and the revisions to Subsections 3.3.1 and 4.3.1.4 in Chapter 4 of this volume.

L2.13 See revised Subsection 4.3.2.2 in Chapter 4 of this volume.

L2.14 See the response to comment L2.2.

L2.15 See revised Subsection 3.12.2 and 4.12.2 in Chapter 4 of this volume.

L2.16 Mitigation measures for inadequate solid waste management practices, including comprehensive waste management improvements, are discussed in Subsection 4.12.3 of the DEIS. The Army's decisions about mitigation measures to be implemented, including a decision about monitoring to ensure the effectiveness of improved waste management practices specific to marine water quality, will be reflected in the Record of Decision. See also responses to comments L2.1 and L2.2.

L2.17 See the response to comment L2.2. Also, refer to Subsections 4.2.1.1 and 4.3.2.4 of the DEIS.

ELECTROMAGNETIC RADIATION

1.
L2.18

The DEIS discusses the hazards from Electromagnetic Radiation (EMR) from exposure to radar and communications equipment. The hazard is associated only with those power levels and frequencies that could cause cellular heating. Accordingly, Permissible Exposure Limits (PELs) are established to prevent exposures to these levels.

The DEIS does not account for a growing body of literature that suggests that potentially significant biological effects and health hazards can be caused by EMR at levels significantly below that necessary to cause cellular heating.

The Office of Technology Assessment now reports that "...under specific circumstances even weak low-frequency electromagnetic fields can produce substantial changes at the cellular level, and in a few experimental settings, effects have also been demonstrated at the level of the whole animal. Epidemiological evidence, while controversial and subject to a variety of criticisms, is beginning to provide a basis for concern about risks from chronic exposure" (see "Biological Effects of Power Frequency Electric & Magnetic Fields - Background Paper", OTA-BP-E-53, May 1989).

a. The FRIS should explain that new research indicates that PELs based upon cellular heating are not sufficient to prevent all potential health effects from chronic exposure, and evaluate whether the proposed project would have potential health effects.

REGULATORY AUTHORITY

1.

The regulatory setting for the U.S. Army Kwajalein Atoll (USAKA) differs significantly from the situation that will be found in DOD facilities located in the U.S. or possessions of the U.S. (e.g., Johnston Atoll). Generally, NEPA applies at USAKA as though USAKA were a part of the U.S. [Section 161(a)(2) of P.L. 99-239]. However, the specific regulatory instruments prescribed by the range of EPA-administered statutes apply only to the extent that the U.S., in consultation with the host country, specifies that they will apply as is, or some in some modified form [Sections 161(a)(4) and 161(f) of P.L. 99-239]. The U.S. has not yet adopted a policy to implement this mandate.

L2.18 See revised Sections 3.15 and 4.15 in Chapter 4 of this volume.

Until the Federal government develops and adopts regulatory mechanisms pursuant to the Compact, the U.S. may adopt an interim policy stating that the existing body of U.S. regulation and extra-territorial environmental policy establishes a baseline from which Federal activities can be developed, evaluated, and implemented on a case-by-case basis.

L2.19

- a. The FEIS should discuss the regulatory regime under which the proposed alternative would be implemented.

L2.19

The EIS was prepared using all current U.S. environmental standards as if the USAKA operations and the proposed actions and alternatives were being conducted in the United States. The Compact of Free Association establishes the mechanism for application of U.S. environmental standards to USAKA. See also response to comment M16. The U.S. Army believes that existing U.S. environmental standards under statutes made applicable by Sections 161(a) 1, 2, and 3 and 161(f) of the Compact provide the judicially reviewable standards that govern activities at USAKA.

Valley Citizens for a Safe Environment
P O Box 317, Granby, MA 01033

L3

August 4, 1989

U S Army Strategic Defense Command
Attention CSSD-H-SSP (LTC Ronald A Keglavits)
P O Box 1500
Huntsville, Alabama 35807-3801

Comments on Draft Environmental Impact Statement (DEIS), "Proposed Actions at U.S. Army Kwajalein Atoll, U.S. Army Strategic Defense Command, June 1989"

Alternatives

- L3.1** 1) Discussion of alternatives should include discussion of "An Alternative US Strategic Defense Program" as proposed by the Union of Concerned Scientists, March 1987. (For more information, contact UCS, 26 Church St., Cambridge, MA. 02238)
- L3.2** 2) Discussion of alternatives is inadequate. It is based on financial, rather than environmental considerations. Impacts on other sites should be discussed as well as consideration of a program change as proposed by the Union of Concerned Scientists
- L3.3** 3) Considering the findings of many significant negative impacts included in this DEIS and considering that the most significant negative environmental impact of all-- nuclear war-- is made more likely by research, development, test, evaluation and deployment of "Strategic Defense," the testing proposed in this study should not be allowed.
- L3.4** 4) No-Action and reduction of current activities should be discussed

Need

- L3.5** 5) Discussion of need refers to 1983 announcement by President Reagan of the Strategic Defense Initiative (SDI). In this announcement, President Reagan proposed that SDI would defend people against nuclear missiles and make nuclear weapons

L3.1 The alternatives proposed for consideration by the commenter are not the proper subject of evaluation in an EIS because they involve political issues not reasonably related to the assessment of environmental impacts from the Proposed Action. The alternatives of reducing or eliminating missile testing in the Pacific Ocean were determined to be unreasonable for the reasons stated in Section 2.6 of the DEIS. These reasons are fully adequate to support a determination of unreasonableness and justify the brief treatment given these alternatives in the DEIS.

L3.2 See the response to comment L3.1.

L3.3 The discussion of the effects of nuclear war in the EIS would be inappropriate because any such analysis would be remote, speculative, and beyond the scope of this EIS.

L3.4 The No-Action Alternative is discussed in detail in the DEIS. The alternative of reducing current activities at USACA was determined to be unreasonable for the reasons stated in Section 2.6 of the DEIS (pages 2-60 through 2-62). These reasons are fully adequate to support a determination of unreasonableness and justify the brief treatment given this alternative in the DEIS.

L3.5 Comment noted. The issues raised by the commenter are not the proper subject of evaluation in an EIS because they are political questions not reasonably related to the assessment of environmental impacts from the Proposed Action and alternatives.

- "impotent and obsolete." As proposed in this DEIS, "SDI will provide flexibility in maintaining the balance between strategic offensive and defensive forces." (DEIS, 1.3) This is not what President Reagan proposed. His speech should not be referred to in this misleading manner, he proposed to build a defense that would allow the dismantling of offensive strategic assets. The DEIS includes plans to test both offensive and defensive weapons. This is a crucial difference and greatly increases the likelihood of maximum negative impact to the environment from proposed actions.
- Anything short of a 100% effective nuclear defense (not just effective against nuclear missiles), will only dramatically escalate the arms race, reduce warning and reaction times (and therefore increase danger of accidental war), and serve to destabilize deterrence. Yet we would still depend on deterrence. Therefore, the proposed actions will have a negative impact on U.S. national security and pose a grave environmental threat as well.
- Missile Launches**
- L3.6** 6) Why are environmental impacts of missile launches on launch sites in Hawaii and California not discussed?
- L3.7** 7) In light of various accidents involving storage and transportation of missiles, discussion should include safety measures for transportation to the above sites as well as Kwajalein Atoll.
- L3.8** 8) Discussion of impacts of missile launches on the upper atmosphere, especially concerning ozone depletion, is inadequate. The fact that studies could not be found concerning effects on the upper atmosphere of missiles and all propellant exhausts (especially Monomethyl Hydrazine and Nitrogen Tetroxide) does not mean harm is not occurring. The significance of potential consequences makes further examination and discussion imperative.
- L3.9** 9) What are likely to be "payloads of opportunity?" Will any contain dangerous materials? Will any emit ionizing or non-ionizing radiation?
- L3.10** 9) What measures will be taken to prevent water contamination from rocket propellant emissions? Are launch pads sealed to prevent water runoff into the ground?
- L3.11** 10) In relation to all base activities, how is fire-fighter training accomplished? If there are burn pits, are they sealed to prevent ground/water contamination?
- L3.6** The evaluation of impacts of missile launches and storage and transportation of missiles at sites other than USAKA was accomplished in the six environmental assessments prepared for the Milestone I Dem/Val decision in 1987, in the GBR and HEDI environmental assessments, and the related facility environmental documents incorporated therein by reference (see Section 2.3 of the DEIS). Other missile launches are, or will be, assessed in separate environmental documents and are outside the scope of this EIS.
- L3.7** See the response to comment L3.6.
- L3.8** Studies of the effect of missile launches on the upper atmosphere are referenced and summarized in Subsection 4.4.1.2 of the DEIS.
- L3.9** "Payloads of opportunity" occur when space or weight are available within the reentry vehicle of a scheduled mission. Payloads of opportunity are typically made up of telemetry, sensors, or transmitters. They may or may not include small quantities of hazardous materials or emit ionizing or non-ionizing radiation. Each mission is critically evaluated for mission requirements and potential hazards before it is approved.
- L3.10** The Meck Island launch silo is drained by a sump. Before discharge to the lagoon, water in the sump is analyzed and neutralized or diluted, if necessary. Launch pads on other islands are not sealed. Rocket propellant emissions during launches are dispersed into the atmosphere and, as described in Subsections 3.4.1 and 4.4.1 of the DEIS, do not have significant environmental impacts.
- L3.11** Live fire-fighter training is conducted once a year in accordance with Army Regulation 420-90. In the past, unlined burn pits were used for this training; however, USAKA no longer follows this practice.

- L3.12** 11) How will reentry areas be policed to prevent accidents from falling debris and possible electromagnetic radiation from radar tracking?
- L3.13** 12) Are missiles flown or shipped to the atoll? What precautions are taken both at USAKA and all points of transshipment to prevent harm to populations? Shipment to launch sites prior to launch toward USAKA should also be discussed (especially for Minuteman missiles)
- L3.14** 13) The DEIS at 2 2 1 states, "RV payloads typically contain no toxic or hazardous materials." Do they ever contain such materials and if so, what are they? What dangers do they pose to people and the environment?
- L3.15** 14) Are all missiles involved in the test programs proposed in the DEIS solid fuel? If not, how are the liquid fuels stored? Are the missiles kept fuelled or filled just prior to launch?
- L3.16** 15) MMH (hydrazine) is discussed as a propellant used at USAKA. Hydrazine is a known carcinogen. What measures have been taken to prevent leakage from storage tanks and possible water contamination due to rocket launch and accidental discharge of this chemical?
- L3.17** 16) What are the effects of land impacts of MMH on Illeginni Island?
- L3.18** 17) Are the hydrophones and acoustic tracking devices active or passive? If they emit sound, how does this affect biota of the ocean?
- L3.19** 18) Are lasers used either to track missiles and RVs or as guidance to maneuvering RVs and kill-vehicles? If so, what measures have been taken to protect USAKA personnel and Marshallese from possible eye or other damage-- including damage from reflections of lasers?
- L3.20** 19) Are lasers being tested as weapons? If so, what class of lasers and what impacts may be possible?
- L3.21** 20) Are lasers being used for any purpose?
- L3.22** 21) Are any experiments or actions being performed to create or Electro-Magnetic Pulse
- L3.12** Range safety procedures for missions involving reentry vehicles and interceptors are discussed in Sections 3.14 and 4.14 of the DEIS. Procedures to prevent exposure to harmful levels of radiation from radar are described in Sections 3.15 and 4.15 of the DEIS.
- L3.13** Missile components are both flown and barged to USAKA. Safety precautions related to hazardous shipments at USAKA are described in Sections 3.14 and 4.14 of the DEIS. See also the response to comment L3.6.
- L3.14** The exact composition of reentry vehicle payloads is classified and may not be publicly discussed. Any payload with potential environmental hazards is evaluated in a separate classified document. See also Subsection 3.14.1.1 of the DEIS for a discussion of reentry vehicle payloads.
- L3.15** As described in Section 2.3 and Subsections 3.12.4.1 and 3.14.1.1 of the DEIS, MMH and nitrogen tetroxide (both liquid fuels) are used in some kill vehicles (KV) for maneuvering. The two fuels are stored on Meck Island in separate storage facilities with catchment basins. Missiles are assembled in the missile assembly building. For the ERIS missions, MMH and nitrogen tetroxide are loaded aboard the KV in separate self-contained 1-gallon packages just before the missile is moved to the launch silo. There is no transfer of MMH or nitrogen tetroxide from one container to another.
- L3.16** See revision to Subsection 4.14.1.2 in Chapter 4 of this volume.
- L3.17** In 1988, a classified environmental assessment was prepared on the land impacts on Illeginni Island that concluded no significant environmental impacts would be expected.

Cont.

L3.18

The Hydro-Acoustic Impacts Timing System (HITS) consists of hydrophones and velocimeters. It is used to passively record and locate the impact of reentry vehicles into the lagoon. The hydrophones are passive (i.e., they emit no sound). The velocimeters briefly emit sound to calibrate the hydrophones (mounted a few inches from the velocimeters on the same anchor blocks) to current water conditions before each mission using the HITS system. The Sonobuoy Missile Impact Location System (SMILS) uses similar equipment, temporarily positioned before each mission on floating buoys in the BOA north and east of Kwajalein, to record reentry vehicle impacts into the ocean. No biological effects are likely from the brief sound emissions required to calibrate these instruments.

L3.19

USAKA has no permanent laser facility; however, the Cast Light Laser Rangefinder (CLLRF) was used for a short time in mid-1989 to track (from Gagan Island) an incoming reentry vehicle. The same system may be used in the future to track other reentry vehicles from the same location. The CLLRF uses a pulsed neodymium-yag laser with a beam diameter of 3.5 inches, a beam divergence of 150 microradians, and a power of 150 millijoules. The hazard range for the laser extends 11.5 nautical miles.

The CLLRF is mounted in a gimble system that limits the laser's use to a specified corridor lying to the northeast of Gagan Island over open ocean. CLLRF missions observe the same notification and safety practices employed for other reentry vehicle missions (see Sections 3.14 and 4.14 of the DEIS). As part of the range safety practices for the CLLRF, personnel involved in the mission (e.g., ground personnel and helicopter pilots) are required to undergo pre- and post-mission eye examinations and to wear eye protection during the mission. At no time can the laser irradiate inhabited areas. Objects radiated by the laser are diffused source reflectors and reflected energy that might be hazardous cannot reach inhabited areas.

L3.20

No lasers are being tested at USAKA as weapons.

L3.21

Aside from those used in common home and business applications (e.g., compact disc players, laser printers, and surveying equipment), the only laser used at USAKA was for the Cast Light Laser Rangefinder (see also the response to comment L3.19).

L3.22

No experiments or actions are being performed at USAKA to create or simulate Electro-Magnetic Pulse.

simulate Electro-Magnetic Pulse (as from nuclear detonations)? If so, where? If underwater, what effects might this have on the biota? How great a pulse is or may be tested and what effects can be anticipated?

Electro-Magnetic Radiation

22) Discussion of *Electro-magnetic radiation appears to be based on threshold standards for human exposure that are based on causing heating in cells. Recent, replicable scientific studies have shown very severe effects on people are possible-- even likely-- at field levels far below those that cause heating of cells. Therefore, all discussion of electro-magnetic radiation in this DEIS drastically and unacceptably underestimates potential harm from electro-magnetic radiation.*

Of particular concern due to this reliance on an outdated and indefensible "safe" threshold is the resulting reduction of the "footprint" or area acknowledged to be affected by this radiation. Electro-magnetic fields have been shown to increase the likelihood or accelerate development of leukemia, cataracts, behavioral changes, brain and other tumors at very low energy levels. If such levels are considered in defining affected areas, it seems quite likely that all USAKA personnel are being exposed to unhealthy levels. Because those personnel do get reassigned, however, their exposure is likely to cause less harm than the exposure of the more than 9,000 Marshallese living near USAKA's radars.

Certainly the incidence of cancer near the PAVE-PAWS radar on Cape Cod, Massachusetts, should indicate that threshold exposures need to be reevaluated.

The DEIS refers to a margin of safety ten times over the standard threshold for electro-magnetic exposure. Nevertheless, this is meaningless since the chosen threshold is hundreds of times greater than field levels that have been statistically correlated-- at significant degrees of certainty-- to very serious health effects.

See studies by Lin (1985), Spitz and Cole (1985), Spears (1986), Phillips (1986a, 1986b, 1986c), Slesun, Wertheimer, Adey

23) What frequency and modulation are the various radars?

24) What precautions will be taken to protect aircraft?

25) What levels of electro-magnetic radiation can be expected at populated areas when the radars are functioning singly and in

L3.23

L3.23 See revised Subsection 4.15.2 in Chapter 4 of this volume.

L3.24

The frequency of each existing radar at USAKA is shown in Table 3.15-1 of the DEIS (see revised Subsection 3.15.1 in Chapter 4 of this volume).

L3.25

Precautions to protect aircraft from radiation by existing and planned radars are described in Subsections 3.15.3 and 4.15.2 of the DEIS.

L3.26

See revised Subsection 4.15.2 in Chapter 4 of this volume.

coordination with each other?

Air Quality

- L3.27** 26) What concentration of pollutant emissions can be expected from individual launches? What are these emissions and threshold levels of these emissions for a 30 minute average?
- L3.28** 27) What levels of Monomethyl Hydrazine emissions are safe? Over what period of time?
- L3.29** 28) Did air quality study include emissions from aircraft maintenance (such as ground run-ups of engines, fuel tank venting, solvent volatilization), aircraft use, air emissions from ships, fire-fighter training, vehicle use and generator emissions? Did it consider them cumulatively with missile launches?
- L3.30** 29) Open trash incineration is likely to cause bad health effects is a properly filtered incinerator planned? Will open burning continue? Are all types of waste materials burned? This apparently daily procedure is dangerous to health and should be stopped
- L3.31** 30) Air quality impacts are significant, what is planned to mitigate effects?
- L3.32** 31) Has groundwater quality been tested for volatile organics and other contaminants, especially near storage tanks and pipelines? If so, what are the results?
- L3.33** 32) Fresh water is collected from runway runoff. How are residues from aircraft use removed from this water? Does any runway runoff go into the groundwater? Has it been sampled?
- L3.34** 33) How does paving for roads, runways, etc. affect runoff and groundwater tables? Is groundwater protected from spills and residues from vehicle and aircraft emissions?
- L3.35** 34) How is hazardous waste from aircraft maintenance and use kept out of water supplies and the groundwater?
- L3.36** 35) The DEIS refers to berms under storage tanks that are inadequate to contain all the contents should there be a failure of the tanks. Will these berms be improved?
- L3.37** 36) Is USAKA undergoing an Installation Restoration Program? If
- L3.27** The air pollutant emissions rates and concentrations of pollutants resulting from individual launches are presented in the text (Subsection 4.4.1.2) and in Tables 4.4-3 and 4.4-4 of the DEIS.
- L3.28** The federal standard and American Conference of Governmental Industrial Hygienists (ACGIH) time-weighted average (TWA) value for monomethyl hydrazine (MMH) is 0.2 ppm (0.35 mg/m³). This threshold value applies to worker exposures (i.e., 8 hours per day for a typical workday) (Sittig, Marshall, Handbook of Toxic and Hazardous Chemicals and Carcinogens. Noyes Publications. Park Ridge, New Jersey 1985).
- L3.29** The air quality study evaluated all of the sources listed in the comment except fire-fighter training (see Subsection 3.4.1 of the DEIS). Fire-fighter training is a short-term, periodic emission source and does not play a significant role relative to other emission sources at USAKA. Fire-fighter training is conducted once a year but does not take place during missile launch periods.
- Cumulative impacts of the emission sources with missile launches were considered in the air quality analysis included in Subsection 4.4.1 of the DEIS.
- L3.30** The DEIS (Subsections 3.12.3 and 4.12.3) describes current waste handling practices and points out their inadequacy. Oil-pit burning is no longer practiced at USAKA. The installation of a properly filtered incinerator is discussed in the DEIS as another possible mitigation measure. The Army's decision about mitigation measures to be implemented at USAKA will be contained in the Record of Decision.
- L3.31** As indicated in the DEIS, Subsection 4.4.1.2, the only significant air quality impacts identified occur on Kwajalein Island. Since the DEIS was published, limited air quality testing was conducted that suggested power plant emissions at Kwajalein and Roi-Namur are within air quality standards applicable in the United States (see Chapter 4 of this volume). Although the testing was not conclusive, tests and analyses showed emissions from solid waste burning at Kwajalein probably exceed air quality standards applicable in the United States. The DEIS addresses mitigation measures, in addition to monitoring, for both Power Plants 1 and 1A and the solid waste burning pit (Subsection 4.4.1.4). The Record of Decision will include the Army's decisions about air quality mitigation measures.

Cont.

L3.32

Groundwater quality has been tested for volatile organics and other contaminants. See revised Subsection 3.12.1 in Chapter 4 of this volume.

L3.33

Potential contaminants from aircraft residues and aircraft maintenance activities would consist primarily of organic hydrocarbons with minor quantities of metals. Normal runoff from the runway would provide transport of any soluble residue to the water catchment system. In addition, maintenance activities have resulted in ground contamination by solvents and possible leaching of solvents into nearby lens wells, as indicated by preliminary monitoring results (see revised Subsections 3.3.1 and 3.12.1 in Chapter 4 of this volume).

Catchment water is visually inspected for floating hydrocarbons before it is pumped to raw water storage tanks. Although there is no system that is designed specifically for removal of the organics found as a product of aircraft traffic or solvent contamination, some removal is afforded by the routine use of charcoal (which provides minimal absorption of organics) in the filtration system. This capability is being enhanced with the installation of a new water treatment system and with an increased monitoring program. These two mitigations will provide the capability and operational information necessary to ensure detection and removal.

Paving contractors at USAKA are now required to use berms to direct runoff away from the catchment; lens well sampling is used to ensure effectiveness of the berming. Spill protection in the runway area, however, is minimal. Efforts are currently under way to revise the site Spill Controls and Countermeasures Plan to achieve more protection against the threat of spills in the runway area.

L3.34

See the response to comment L3.33.

L3.35

See the response to comment L3.33.

L3.36

Upgrading and replacing the fuel storage facilities are mitigation measures described in the DEIS (Subsection 4.12.4.4). Decisions about the mitigation measures to be implemented at USAKA will be contained in the Record of Decision.

L3.37

USAKA is not undergoing an Installation Restoration Program.

so, please send us copies

L3.38 37) What herbicides and pesticides are used at USAKA, especially on the golf courses? How much of them is used? Is groundwater regularly tested for these chemicals?

L3.39 38) The DEIS says that increasing the population for the proposed actions will lead to increased outflow of thermal effluents. Fish poisoning is also mentioned. Is algal blooming from thermal and septic effluents a potential source of the fish poisoning and what will be done to prevent it?

L3.40 39) Increased population will also lead to more fuel consumption. What is the spill response plan for fuel shipments? For other hazardous materials?

L3.41 40) As building materials are quarried from the coral reef, what effects result from sediment and turbidity during quarrying and dredging?

L3.42 41) The DEIS says at 3.3.2.1 that "Water quality in the immediate vicinity of Kwajalein Island is generally of the same pristine condition as the surrounding ocean and lagoon waters," yet tables show high levels of contamination in fish, coral, crabs, and water. The DEIS states that the Marshallese depend for subsistence on seafood. Yet virtually all the seafood sampled for Table 3.3-5 shows levels of metals far above TPII EPB standards. What is being done to correct this dangerous situation? Some fish are carrying over a hundred thousand times the TPII water standard for some metals (if tissue standards exist, they should be given). This water may look nice, but it is obviously far from "pristine."

L3.43 42) Table 3.3-5 shows a problem. Is dumping going to continue? What is going into these dumps? What are other possible sources?

L3.44 43) One of the particulate emissions from missile launches is listed as aluminum hydroxide. Is this substance detectable in the groundwater, seawater or biota? How much? What are the likely effects?

L3.45 44) What is the overall capacity of sewage treatment facilities on USAKA? Are septic systems tested regularly? Are they pumped regularly? If so, what is done with the sludge? When will the sewage treatment plant be upgraded?

Notes

L3.38 The herbicides and pesticides used at Kwajalein and their approximate use per year are listed below. The only pesticide or herbicide used on the golf course is Dursban. Drinking water is tested regularly for those pesticide/herbicide components required to be tested for by the Safe Drinking Water Act regulations.

Name	Consumption/Rate
Super Trimec	30 gal/yr
Roundup	10 gal/yr
Dursban 4E	3 gal/yr
Dursban Turf	2 gal/yr
Scourge	12 gal/yr
Talon	5 cases or 100 lb/yr
Golden Milrin	48 lb/yr
Baytex 4E	4 gal/yr
Gencor	26 ea of 0.5-ml vials/yr

L3.39 It is unlikely that the proposed action would cause algal blooms or represent a potential source of fish poisoning in the Kwajalein Atoll through the mechanism of thermal or sewage effluents.

In clear, warm tropical waters, nutrients rather than temperature are the limiting factor for marine plant growth. Therefore, increased marine water temperature from thermal outfalls would not cause algal blooms.

Although it is possible that the nutrients added to marine waters by the sewage outfalls at Kwajalein and Roi-Namur could favor algal blooms, investigations of the existing outfalls showed no evidence that this is the case (see the DEIS, Subsection 3.3.2). The proposed sewage treatment plant at Roi-Namur will further reduce the probability that sewage could contribute to algal blooms.

There is no conclusive link between the occurrence of fish poisoning (ciguatera) and the presence of sewage effluent. Ciguatera is a natural phenomenon that occurs in the marine environment between 35° north and 35° south latitudes. Outbreaks of ciguatera occasionally happen in areas where there has been no disturbance by man and, contrarily, outbreaks are often absent from areas disturbed by man.

L3.40 See revised Subsection 4.12.4.1 in Chapter 4 of this volume.

L3.41 The effects of quarrying on marine biota, including the effects of sedimentation and turbidity, and potential mitigation measures are discussed in Subsections 3.2.2.3 and Sections 4.3 and 4.6 of the DEIS.

Cont.

L3.42

Although the DEIS stated that water quality in the immediate vicinity of Kwajalein Island was generally of the same pristine condition as the surrounding ocean and lagoon waters, it also states (Subsection 3.3.2) that heavy metal contaminants occurred in a few localized areas. The DEIS proposes mitigation actions, including improved solid and hazardous waste management practices, to prevent additional contamination. USAKA is also proposing additional marine water quality sampling, including tissue sampling, to assess the extent of the problem.

The Trust Territory of the Pacific Islands standards for metal concentrations presented for marine biota in the DEIS (Tables 3.3-2 and 3.3-5) are outdated. The revised standards (as amended March 31, 1986) are shown in revised Subsection 3.3.2 in Chapter 4 of this volume. For some metals (copper in particular), the new standards permit higher concentrations than did the old standards.

The Trust Territory of the Pacific Islands water quality standards are provided in Table 3.3-5 for comparison with the water quality data. Aquatic species can bioaccumulate metal in their tissues (at rates that differ among species) and, therefore, metal levels in tissue cannot be directly compared with the water quality standards.

L3.43

See Subsections 3.3.2, 3.12.3, 3.12.4, 4.12.3.4, and 4.12.4.4 of the DEIS. Decisions about the mitigation measures to be implemented at USAKA will be contained in the Record of Decision.

L3.44

The particulate of concern is aluminum oxide, not aluminum hydroxide. There are no known environmental concerns related to aluminum oxide as a particulate.

L3.45

The capacities of the sewage treatment facilities on Roi-Namur and Kwajalein are discussed in Subsection 3.12.2 of the DEIS. The septic systems on Roi-Namur, Meck, and Ennylabegan are pumped regularly, but are not tested regularly. Regular testing of seepage is not the usual practice for most seepage systems except to monitor sludge buildup levels or where a problem is known to exist. As stated in revised Subsection 3.12.3.1 in Chapter 4 of this volume, seepage from Meck and Ennylabegan is now processed through the Kwajalein sewage treatment plant. On Roi-Namur, seepage is buried in pits. The proposed sewage treatment plant at Roi-Namur is scheduled for construction in 1990, as described in Subsection 4.12.2.2 of the DEIS (page 4-70). The existing Kwajalein sewage treatment plant will be upgraded only if an effectiveness study shows that additional capacity or other upgrade is required to meet demand.

L3.46 45) 154 dBA at 250 feet is literally ear-shattering. What are the Sound Exposure Levels from missile launches measured at all populated areas? What are peak dBA levels?

L3.47 46) Is there any program to test the indigenous population for hearing loss?

L3.48 47) Annoyance and hearing loss from noise are cumulative. If people are exposed to construction noise, aircraft noise, and rocket noise, what effects can be expected? What are the noise levels from aircraft operations?

L3.49 48) Annoyance and hearing loss from noise may come in a relatively short period of time. What are peak one-hour noise levels in populated areas?

L3.50 49) If figure 3.4-1 is for a single aircraft landing and take-off, what kind of plane is it? If it represents an average noise level, how long a period is averaged and what type of aircraft? What are the average noise levels for peak periods of use, however long that peak use lasts (such as during training sorties)?

L3.51 50) Is the indigenous population warned about the danger to their hearing that missile launch noise may cause and are they told when rocket launches will occur so they can prepare for them (e.g. go inside)?

L3.52 51) To interpret the fact that the indigenous population has lived with USAKA noise for thirty years as meaning that such noise is acceptable is disingenuous. It fails to take into account such factors as whether indigenous peoples felt they could do anything about the noise or even whether hearing loss or other serious noise-related health effects may not already be occurring. Heart disease has been linked to stress from noise and heart disease is listed in this DEIS as a health problem among the indigenous people. Before noise and especially increases in noise are accepted, effects on the population should not be discounted.

L3.53 52) Are aircraft routed over populated areas? If so, can they be re-routed?

L3.54 53) Do aircraft carrying high explosives, rocket fuels or other hazardous materials ever fly over populated areas? If so, can they be re-routed?

L3.46 The 154-dBA noise level at a distance of 250 feet was cited to provide an understanding of the relative amount of noise energy for the loudest rocket launch. It is meaningless to relate that level to effects on hearing because personnel are not allowed to be that close to a launch. Personnel on the launch islands are subject to workplace noise limitations as described in Subsection 3.4.2, page 3-54, of the DEIS.

Estimated peak (maximum) sound levels from current and proposed rocket launches are shown in Figures 3.4-3, 4.4-1, 4.4-2, and 4.4-3 of the DEIS. The following table summarizes the sound exposure level (SEL) and maximum sound levels (derived from DEIS figures) at the closest inhabited islands to the launch islands.

The SEL for a rocket launch is the sound level of one second duration that would contain the same amount of sound energy that the rocket launch would generate over its complete duration. The SEL indicator is used to compare the sound energy of events of different durations.

Launch Island	Closest Inhabited Island	Rocket	Sound Exposure Level	Maximum Level
Roi-Namur	Ennubarr	HAVE-JEEP and SBI	91 dBA	83 dBA
Omelek	Mingi	GSTS	96 dBA	71 dBA
Mack	Mingi	HFDI, SBI, EATS, SBI	89 dBA	65 dBA

These levels are within the range of normal, daily human exposure.

L3.47 There is no hearing loss test program for the indigenous population because the noise levels are not high enough at the inhabited islands that hearing loss should be a concern. EPA has determined that hearing loss is not a concern unless the 24-hour average noise level (L_{eq}) is 70 dBA or more consistently over a period of 40 years. The 96-dBA SEL at Ningi is equivalent to a 24-hour L_{eq} of 47 dBA, which is much less than the hearing loss criteria (70 dBA), and would not occur in any case on a daily basis.

The workplace occupational noise program described in Subsection 3.4.2, page 3-54, of the DEIS applies to any of the indigenous population working on USAKA.

L3.48 Noise levels from various sources are cumulative. However, the levels from the various sources are each low enough that the total cumulative amount should not be significant. Existing aircraft noise contours are shown in Figures 3.4-1 and 3.4-2 (pages 3-55 and 3-59) in the DEIS. Future aircraft noise levels are expected to increase by about 1 dBA.

Cont.

L3.49

The peak instantaneous (maximum) levels resulting from rocket launches are listed in the response to comment L3.46. The sound exposure levels can be averaged over a 1-hour period as follows:

Inhabited Island	1-Hour Level, based on SEL
Ennubirr Ningi	47 dBA 35 dBA

These noise levels are not a threat to hearing, based on EPA criteria. Annoyance is much more subjective, but should be minor, because of the infrequency of rocket launches.

L3.50

Figure 3.4-1 (page 3-55) in the DEIS represents the annual average day-night noise levels (DNL) from all aircraft using the airport at Kwajalein. These were estimated by using the Federal Aviation Administration's INM computer model, as noted in Subsection 3.4.2, page 3-54, of the DEIS. Aircraft operations are summarized in Table 3.11-1 of the DEIS. Noise levels for periods other than the annual average are not available. It is common practice in the United States to evaluate airport noise based on annual DNL levels.

L3.51

Warnings are given prior to launches for safety reasons. The indigenous population will not be exposed to noise levels that could cause hearing loss.

L3.52

Comment noted.

L3.53


Commercial air flights (Continental-Air Micronesia) often fly over populated areas of Kwajalein and Ebeye Islands in their approaches to the Kwajalein airfield. Approach and takeoff paths of commercial aircraft are regulated by international aviation regulations that take into account noise and safety concerns. Military aircraft do not fly over Ebeye or the inhabited areas of Kwajalein Island in their terminal approaches or takeoff paths.

L3.54

All explosives and rocket fuels that are transported to USAKA by air are shipped by Military Airlift Command (MAC) flights. The MAC flights do not fly over Ebeye or the populated areas on Kwajalein during either their terminal approaches or takeoff paths.

- L3.55 54) How many aircraft accidents have there been at USAKA?
- L3.56 55) Do any missiles fire over populated areas? If missiles fail or are destroyed, how are fishermen or others protected from debris? Are fumes from such an accident toxic? If so, is there potential for human exposure to dangerous fumes?
- L3.57 56) Has all biota in and around USAKA been surveyed?
- L3.58 57) "Beach Repair" is cited as a major job at USAKA. What is being done to insure that such activities do not impinge on turtle nesting areas?
- L3.59 58) Overpopulation of USAKA is going to impact all wildlife around the atoll. This proposal adds to that impact. Protection of endangered species as required by the Endangered Species Act also requires protection of the related ecosystem. This proposal should be denied because current practices already further endanger the endangered species listed in the DEIS and because the proposed actions can only add to the adverse impacts.
- L3.60 59) The SDI program proposed for testing here is not the one President Reagan announced. He wanted to end the policy of Mutual Assured Destruction by creating a perfect Peace Shield. The program discussed in this EIS is for both offense and defense. It fails to free the U.S. from its MAD deterrent stance, yet it is destabilizing and increases the likelihood of accidental war. It will lead to vastly increased arsenals and will diminish prospects for arms reductions. It greatly adds to the incentive of either side to be the first one to attack and therefore makes attack more likely. For these and many other reasons (see the Union of Concerned Scientists, "Empty Promise" and "Star Wars- Myth and Reality"), proposed testing in support of SDI endangers all life on earth and should not be accepted.

Prepared for Valley Citizens for a Safe Environment by:


David Keith
96 Reservation Road
Sunderland, MA 01375

August 4, 1989

- L3.55 Accident data since January 1, 1984, show no aviation accidents at USAKA.
- L3.56 Missiles are programmed to not fly over populated areas. In the planning for missile destruction in the event of a mishap after launch, protection zones are plotted to ensure that no people will be exposed to debris and fumes. Range safety hazard areas are described in Subsection 3.14.2 of the DEIS.
- L3.57 The biota in and around USAKA have been surveyed. The DEIS, Chapter 3, provides information in narrative and tabular forms. See Section 3.1, Land and Reef Areas; Section 3.3, Water Resources; Section 3.5, Island Plants and Animals; Section 3.6, Marine Biological Resources; and Section 3.7, Rare, Threatened, or Endangered Species. Surveys and studies referenced in the text and listed in the bibliography also reflect the biota considered.
- L3.58 As stated in the DEIS, a careful survey of the shores of the eight outer islands conducted in March 1988 showed no evidence of previous nesting by sea turtles, although sea turtles were observed in the water. See Subsection 4.7.2 for additional discussion of sea turtle protection measures.
- L3.59 Potential impacts of the Proposed Action on endangered species are discussed in Section 4.7 of the DEIS. The Proposed Action was reviewed by the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration (see the correspondence included in the appendix to the DEIS). The two agencies concurred that the Proposed Action is unlikely to affect listed endangered species.
- L3.60 Comment noted.



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L4

August 2, 1989

United States Army Strategic Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801

Att: CSSD-H-SSP (LTC Ronald A. Keglovitz)

To the Strategic Defense Command:

L4.1

Pursuant to the National Environmental Policy Act and its implementing regulations, the Massachusetts Chapter of the Lawyers Alliance for Nuclear Arms Control, Inc. files the enclosed Comment on the Draft Environmental Impact Statement dated June 12, 1989, on the Proposed Actions of the United States Army Strategic Defense Command at United States Army Kwajalein Atoll. The Lawyers Alliance believes, for the reasons stated in our Comment, that this Draft Environmental Impact Statement fails to provide full and fair discussion of all significant environmental impacts and reasonable alternatives as required by law.

Please inform us of all further actions taken by the Strategic Defense Command in this matter.

Sincerely,

Herbert P. Gleason
Massachusetts Chapter,
Lawyers Alliance for Nuclear
Arms Control

Enclosure

L4.1

The EIS has been prepared to meet all requirements of NEPA. It is sufficiently detailed to provide a full and fair discussion of the environmental impacts of the Proposed Action and alternatives. A reasonable set of alternatives was developed and assessed in the DEIS in full compliance with the spirit and intent of NEPA. Alternatives that are not pursued in detail in the DEIS are described in Section 2.6 (pages 2-60 through 2-62) and sufficient reasons are given to support the conclusion that these alternative are unreasonable.

COMMENT OF THE MASSACHUSETTS CHAPTER
OF THE LAWYERS ALLIANCE FOR NUCLEAR ARMS CONTROL
ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
ON PROPOSED ACTIONS AT U.S. ARMY KWAJALEIN ATOLL

L4.1
Cont.

August 1, 1989

By: Stephanie A. Levin
c/o Lawyers Alliance for
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Introduction

On June 12, 1989, the United States Army Strategic Defense Command released its Draft Environmental Impact Statement (DEIS) for proposed Strategic Defense Initiative (SDI) and other activities at the United States Army Kwajalein Atoll (USAKA). Pursuant to the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. § 4321 et. seq. and its implementing regulations, 40 C.F.R. § 1502 et seq. (1988), the Massachusetts Chapter of the Lawyers Alliance for Nuclear Arms Control (LANAC) submits this Public Comment in response to this DEIS.

LANAC is a nonpartisan, nonprofit, educational association of legal professionals working to halt the nuclear arms race. We believe for the reasons given below that the DEIS fails to provide the full and fair discussion of all significant environmental impacts and reasonable alternatives which is necessary to insure that NEPA's twin goals of requiring agencies to "take a 'hard look' at environmental consequences" and "provide for broad dissemination of relevant environment information" are met. See

L4.2

A. The DEIS Fails to Address Implications of the Proposed Actions for the ABM Treaty

The only references to the Anti-Ballistic Missile (ABM) Treaty of 1972 in the DEIS are two brief references to the fact that USAKA is one of only two United States test ranges named in the Treaty as permissible sites for conducting testing of land-based ABM systems or components. The DEIS entirely fails to address the critical question of whether the proposed actions would be in compliance with the terms of that Treaty, or would, as many arms control experts have suggested, violate a reasonable reading of the Treaty and dangerously circumvent its intent.

The Airborne Optical Adjunct (AOA), Exoatmospheric Reentry-Vehicle Interceptor Subsystems (ERIS), and Space-Based Interceptor (SBI)---all programs covered by the DEIS---have been identified as posing particular threats to the ABM Treaty. As Matthew Bunn, a senior research analyst at the Arms Control Association in Washington, D.C., wrote in the April 1988 issue of Arms Control Today, "AOA would appear to violate the ABM Treaty's ban on air-based systems" and the tests of SBI "clearly represent an effort to 'work around' the treaty's restraints, running directly contrary to the object and purpose of the ban on space-based testing." John Pike, Associate Director for Space Policy of the Federation of American Scientists, has also stated that once AOA is moved to the Kwajalein Missile Range it would appear to be inconsistent with Article V of the Treaty, which bans development or testing of air or space-based components

L4.2

All tests associated with the development of the Strategic Defense Initiative (SDI) undergo review for compliance with the Anti-Ballistic Missile (ABM) Treaty of 1972 by DOD Compliance Review Group under the direction of the Under Secretary of Defense for Acquisition. Whether the tests associated with SDI that will be conducted at USAKA comply with the terms of the ABM Treaty is not the proper subject of an EIS, which evaluates the environmental impacts of those activities. The effects of nuclear war are remote and speculative and are not within the scope of the Proposed Action and the alternatives that are evaluated in the EIS.

Article VI of the Treaty states that "each Party undertakes: (a) not to give missiles, launchers other than ABM interceptor missiles, ABM launchers capabilities to counter strategic ballistic missiles or their elements in flight trajectory, and not to test them in an ABM mode;"

Yet testing of the SBI, ERI3, and GST3 technologies, and perhaps others, would involve the use of Minuteman and Arise missiles in an ABM mode, to test sensing, tracking, and homing devices, in apparent violation of the Article VI undertaking. See A. Sherr, Legal Issues of the 'Star Wars' Defense Program (Lawyers Alliance for Nuclear Arms Control 1984); and Chayes & Chayes, Testing and Development of 'Exotic' Systems Under the ABM Treaty: The Great Reinterpretation Game, 99 Harv. L. Rev. 1956 (1986).

The ABM Treaty is made part of United States law by Article VI of the United States Constitution. It begins by articulating the undeniable premise that "nuclear war would have devastating consequences for all mankind," and seeks to protect against those consequences, among which would be the ruinous effects on the environment of nuclear fallout, contaminated air and water, nuclear winter, and so on. Violation or erosion of the Treaty is thus an environmental impact which must be considered. By failing even to consider the contentions of those who believe that the proposed actions would seriously endanger the ABM Treaty regime, the agency has failed in its obligation to "make every effort to disclose and discuss at appropriate points in the draft statement all major points of view" 40 C.F.R. § 1502.9(a).

L4.3

B. The DDIS Fails to Consider the Proposed Actions in the Context of Overall SDI Development

Although this DDIS assesses only certain specific actions planned for USAKA, this cannot obscure the fact that each of these is part and parcel of a

3

L4.3

The EIS completes the process that began in 1987 of evaluating the environmental impacts of moving the planned Phase I Strategic Defense System (SDS) from concept exploration to demonstration/validation (Dem/Val) testing. The Strategic Defense Initiative Organization (SDIO) prepared six environmental assessments (EA) and a summary EA to support a decision to advance six separate technologies from concept exploration to the Dem/Val step in the acquisition process. The result of the EAs was a Finding Of No Significant Impacts for Dem/Val testing activities in the United States. However, three of the EAs concluded that there was a potential for significant environmental impacts from Dem/Val test activities at USAKA. A joint decision was made by the U.S. Army and SDIO to prepare an EIS to assess the environmental impacts of SDI tests at USAKA. Therefore, the EIS is not a segmentation of the analysis of SDI Dem/Val activities but is, instead, a continuation of the comprehensive process to evaluate environmental impacts from the testing, including cumulative impacts.

The issue of the timing of a programmatic environmental document for a Strategic Defense System (SDS) has been addressed in the SDIO Environmental Impact Analysis Framework. In that document, SDIO presented its analysis that the proper time for a programmatic evaluation was at the Full Scale Engineering Development (FSD) Milestone of the acquisition process. This conclusion was based on a determination that no irrevocable commitment to an SDS could occur prior to FSD because the technologies under exploration were not mature enough to determine their military feasibility. Further, the DOD acquisition decision process is designed specifically to ensure that the program does not reach a stage of investment likely to compel full development prematurely. The dynamics of the SDI development process, moreover, do not restrict later alternatives and do not commit to subsequent development during the concept exploration phase. A new technology can be included in the SDS planning architecture and an existing one can be deleted at any time. For these reasons, SDIO believes that the appropriate time for a programmatic assessment of an SDS is when it supports an FSD decision.

larger SDI program which the government says it is determined to bring to completion. Former President Reagan's speech to the Nation on March 23, 1983, and repeated assurances since that time leave no room for doubt that SDI is a single coherent project, even though it must necessarily be pursued incrementally because of its vast size and complexity. This DEIS is only part of a larger process of moving "the planned Phase I Strategic Defense System (SDS) technologies from concept exploration to demonstration and validation (Dem/Val) testing." DEIS at 1-9.

The case of Scientists' Institute for Public Information, Inc. v. Atomic Energy Commission, 481 F.2d 1079 (D.C. Cir. 1973), is instructive. There the court said:

NEPA's objective of controlling the impact of technology on the environment cannot be served by all practicable means . . . unless the statute's action forcing impact statement process is applied to ongoing federal agency programs aimed at developing new technologies which, when applied, will affect the environment. To wait until a technology attains a stage of complete . . . feasibility before considering the possible adverse environmental effects attendant upon ultimate application of the technology will undoubtedly frustrate meaningful consideration and balancing of environmental costs against economic and other benefits. 481 F.2d at 1089.

SDI is unquestionably a "major federal action" significantly affecting the human environment. It currently employs thousands of workers in and out of government at locations around the country, and it commands a budget of several billion dollars a year. NEPA requires comprehensive consideration of the cumulative impacts of this entire project. Segmentation of analysis makes it impossible for the public (and perhaps for DOD) to consider the overall effect of the proposals. Susquehanna Valley Alliance v. Three Mile Island, 619 F.2d 231, 240 (3d Cir. 1980), cert. denied, 449 U.S. 1096 (1981).

This DEIS is individually inadequate for the reasons stated throughout this Comment. In addition, a programmatic EIS should be prepared at this time for the entire SDI program proposal. This would enable DOD to make a fully reasoned choice among alternatives and to demonstrate to the public that effects and alternatives both were considered in the process of choosing.

In the alternative, even if an EIS is not prepared for the entire SDI proposal at this time, such a statement ought to be prepared for the entire proposed Demonstration/Validation phase of SDI. The regulations provide that when preparing statements on "broad actions," of which SDI should be considered one, agencies may find it useful to evaluate the proposal:

By stage of technological development including federal or federally assisted research, development or demonstration programs for new technologies which, if applied, could significantly affect the quality of the human environment. Statements shall be prepared on such programs and shall be available before the program has reached a stage of investment or commitment to implementation likely to determine subsequent development or restrict later alternatives.

40 C.F.R. Sec. 1502.4(c)(3) (1988). An EIS is needed for this entire "stage of technological development," because of the effects it could have on the environment if applied, and because of the additional momentum it would give to the entire SDI project.

L4.4

C. The DEIS Fails to Fully Address Alternatives

NEPA requires the preparation of a statement of assessment addressing alternatives to the proposed action, 42 U.S.C. Secs. 4332(C)(iii) and (E) (1982); including the alternative of not carrying out the proposal. Since the avowed purpose of the SDI program is to help keep the Nation safe against nuclear attack, the DEIS must also address alternative methods of achieving the same goal, including arms control negotiations and improved communications

L4.4 See the response to comment L3...

between the superpowers, that could serve to reduce stocks of offensive nuclear weapons and diminish the likelihood that a defensive system ever would be needed.

Although the alternative of reducing or eliminating missile testing in the Pacific Ocean was considered early in the process, it was quickly eliminated as "unreasonable." DEIS at 2-60, 2-61. The discussion of this alternative is woefully inadequate, in violation of the fundamental requirement that evaluation of alternatives under NEPA not be merely "conclusory." Citizen Advocates for Responsible Growth v. Dole, 770 F.2d 423, 433-434 (9th Cir. 1985).

D The DEIS Fails to Consider
that SDI Might Actually
Precipitate a Nuclear War

L4.5 See the response to comment L3.1.

L4.5

Although the probability of its occurrence may be low, it is reasonably foreseeable that the proposed actions would have the consequence of increasing the chance of precipitating a nuclear war. Discussion of such a possible result in an environmental impact statement is required.

First, a number of experts now believe that the most likely (and most cost-effective) Soviet response to the development of SDI would be deployment of large numbers of new land-based missiles and warheads, to enable it to overwhelm SDI defenses by saturation beyond the defense system's response capacity. The resulting buildup in Soviet weaponry, if it occurred, would increase the likelihood of an accidental launch and consequential conflagration. It would also increase the severity of the environmental impact of a nuclear war if the weapons were used deliberately. The DEIS does not address this possibility.

Second, there is also widespread concern that the further development of the SDI project would make it more likely that the Soviet Union would launch a preemptive first nuclear strike against the United States. The reason for this concern is the oft-repeated Soviet belief that SDI is in fact an offensive weapons program. If SDI could be truly effective in warding off a retaliatory second strike by Soviet forces, according to this view, the United States would feel free to launch a first strike without fear of reprisal. Thus, SDI could undermine the policy of deterrence that may have prevented a nuclear exchange up to this point. The Soviets might conclude that their interests would be best served by trying to destroy both offensive and defensive United States weaponry before deployment of SDI could be completed. See, e.g., Dietrich Fischer, The Strategic Defense Initiative As A Cause of Crisis Instability, 15 J. Legia. 139 (1989).

Although these concerns have political overtones, their discussion in an environmental impact statement would not implicate strategic or tactical military decisions by the President or Congress to use the SDI system. The fundamental informational purpose of NEPA to require an informed decisionmaking process and public disclosure (within limits prescribed by consideration for the national security) makes it imperative to prepare a statement addressing the likelihood that the proposed actions will increase the likelihood of nuclear war.

2. The DEIS Fails to Consider Possible Impacts of Increased SDI Activity at USKA on Other Parts of the Marshall Islands

Although increased SDI and other test activity at USKA is likely to effect the region of the Marshall Islands generally, the DEIS fails to consider any impacts on the natural or human environment of the Republic of

L4.6

The methodology used in preparing the EIS considered regional as well as localized impacts from the Proposed Action and alternatives. Each activity was assessed against 26 identified resource categories. For each resource category, a region of influence was established based on the predictable and potential consequences of the activity in relation to the resource. The potential for long- and short-term impacts (both direct and indirect) was evaluated for each resource group. Where analysis showed no direct, indirect, or reasonably predictable impacts on resources outside the region of influence, no further evaluation was conducted. See also revised Subsection 4.15.2 in Chapter 4 of this volume regarding the health effects of electromagnetic radiation.

the Marshall Islands as a whole. In light of the devastating impact of earlier programs of United States military testing on the people of the Marshall Islands, see *People of Eniwetok v. United States*, 864 F.2d 134 (Fed Cir. 1989) cert. denied 109 S.Ct. 3198 (1989) and cases cited therein, this DEIS is unduly narrow in its consideration of potential regional impacts. For example, the discussion of the possible impact of the proposed actions on rare, threatened, or endangered species is limited to only those species actually found at USAKA. But an adequate discussion of this topic would require in-depth consideration of the impact of increased testing on the regional ecology as a whole. Furthermore, the long-range impact of the proposed actions on the human population is not considered. For example, there is increasing evidence that low frequency electromagnetic radiation contributes to far higher than normal incidence of cancer in exposed populations. Since such radiation will increase as a result of the proposed actions, this long-term impact must be evaluated.

L4.7

Conclusion

The environmental assessment provided by this DEIS is superficial, conclusory, and unduly narrow, and fails to provide the "hard look" that the National Environmental Policy Act requires. Until it is supplemented with further consideration of neglected issues and alternatives, as well as by the preparation of environmental impact statements for the entire SDI program and for the demonstration and validation (Dem/Val) testing of Phase I as a whole, we cannot be satisfied that DOD has fairly considered all the important environmental consequences or alternatives in deciding to go forward with the SDI program.

Respectfully submitted,
Massachusetts Chapter,
Lawyers Alliance for Nuclear
Arms Control

L4.7 See the responses to comment L4.1.

L5

I am writing to ask you
to see on S. other fishing
HVS over the Kujajale, MA
of the Marched 1989

FISHING OFF JETTY, S. BAY,
CAPE COD - MA
P.O. Box 1500
Huntsville, AL 35807-3801

Aside from it being a waste
of money the address
imprint on the environment
will be further waste of
the few natural
resources we have left
on this planet.

Sincerely,

Ben Patchen 137800
PO Box 282, N. Touro, MA 02652



L5

Comment noted.

POST CARD

U.S. Army Strategic Defense
ATTN: C5SD-H-55 PLCL RA. KEOVITS
P.O. Box 1500
Huntsville, ALABAMA
35807-3801

L6

Dear Sir

July 29, 1989
It has come to my attention that there is a proposal to have the U.S. military do further testing of nuclear weapons in the Marshall Islands.

May I register my strong objection for any action of this kind? As a taxpayer I do not want funds used for that purpose. As an American I do not want my country's name used for further nuclear damage to human and the environment.

Please add my voice to all the outcry you should receive against this kind of testing.

Sincerely,
(M) Marie A. Kollib
PO Box 1473
Orleans, Massachusetts
02653

L6 Comment noted. See second paragraph of Section 2.3 of the DEIS.

P.O. Box 1158
Eastham Ma. 02642
July 31, 1989

Dear Commander Keylovits,
I am writing to say that I
strongly urge the army not to
test nuclear devices in the Marshall
Islands. May I add that I am
opposed to nuclear testing of any
kind.

Thank you.

Very truly yours,
Judith Cicero
(Judith Cicero)

L7

Comment noted. See second paragraph of Section 2.3 of the
DEIS.

L7



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7381

L8

Colonel Samuel N. Liberatore
U. S. Army Strategic Defense Command
P.O. Box 1550
Huntsville, Alabama 35807-3801

Dear Colonel Liberatore:

August 9, 1989
RE:0536

Draft Environmental Impact Statement (EIS)
U.S. Army Kaejalein Atoll (USAKA)
Republic of the Marshall Islands

The above referenced document examines the environmental impacts of the "Proposed Action" which includes installation and testing of the Strategic Defense Initiative (SDI), sensing/tracking equipment and interceptor missile programs, together with ongoing and planned non-SDI activities. The other planned activities include five construction projects in support of base operations. Our review was prepared with the assistance of C. Anna Ulaszinski of the Environmental Center.

Due to constraints of resources and competing responsibilities, we were unable to conduct a comprehensive review of this document in its entirety. The following issues have been identified as having potentially adverse effects on the health and welfare of the people who work and live on USAKA.

Water Resources 4.3

Freshwater

Hydrocarbons were observed in the groundwater in the vicinity of the Power Plant fuel tank farm (p. 3-34).

Marine Water Quality

Seepage

Additional activity could result in "periodic exceedances of suspended solids and BOD standards" in marine water. Presently, there is no evidence of residual ecological effects of discharges. However, according to this document, the collection system on Kaejalein is over 30 years old and may be deteriorating; also, the seepage treatment plant is nearing its design hydraulic capacity. Additional stress on the system could result in releases of raw sewage.

L8.1

See responses to comments M11 and L1.1.

L8.2

Comment noted.

1 Unit of Water Resources Research Center

AN EQUAL OPPORTUNITY EMPLOYER

NOTE: This letter is dated after the close of the comment period.

August 8, 1989

Solid Waste

L8.3

Additional activity at USANA will increase the likelihood of further groundwater and marine water degradation. According to this document, "adverse water quality impacts are predicted to be significant off the Rønjalein solid waste complex and may be significant off the Røi-Namur site." Presently, heavy metal levels exceed the EPA water quality guidelines for copper and lead, and exceed Trust Territory receiving water quality standards for copper and zinc (3.3.2). Marine life off the Rønjalein inland solid waste complex have bioaccumulated copper and other heavy metals. Also, "the additional effects of nutrient and bacterial loadings have degraded water quality." "Petroleum was also detectable as a visible film at the same site."

L8.3 See revised Tables 3.3-2 and 3.3-5 and revised Subsection 3.3.2.1 in Chapter 4 of this volume.

L8.4

According to this document, monitoring is recommended to determine "whether improvements in waste handling procedures result in improvements to adjacent water quality". However, the leachate from the landfill will continue to affect groundwater and marine water for many years even if handling procedures are improved. This document does not provide information regarding improved handling procedures. The information provided by this document indicates that there are some very serious problems with the present methods of handling waste. The following are areas which we feel urgently need attention, and remedial plans should be included in a Supplementary EIS:

L8.4 Improved waste handling practices are outlined in the Waste Management Plan prepared for USAKA. These improved practices include inventorying and tracking of waste, proper storage, and segregation and proper shipment for disposal. Implementation plans for waste handling are being developed in conjunction with the EIS and specific mitigation measures will be identified in the Record of Decision.

L8.5

1) Currently, there is no organized program for the disposal of construction debris, yet the ongoing and proposed construction activities will produce "significant" amounts of debris. Bulk scrap and other construction debris is either left in place or simply moved out of the way.

L8.5 Comment noted.

L8.6

2) Asbestos containing material is stored in the abandoned Building 1045. We question whether this present practice of asbestos handling is in accordance with EPA regulations. Any accidental destruction of this building will result in the release of asbestos particles into the environment.

L8.6 Comment noted.

L8.7

3) Lead-acid batteries are not recycled or reclaimed. According to this document, approximately 650 spent batteries are generated and subsequently disposed of in the landfill. There is indication that lead contaminated leachate is presently affecting marine water quality.

L8.7 Comment noted.

L8.8

4) There are 33 above ground and 10 underground fuel storage tanks located on USANA. Section 3.12.4.1 states that the design of the berm wall "may not provide sufficient capacity to contain a major release." "A layer of hydrocarbon was observed floating on the water table" which "yields evidence to the potential of leaking tanks and/or the lack of containment".

L8.8 Comment noted.

L8.9

5) Solvents and other petroleum products are stored in 55-gallon containers above unlined ground surfaces. "Stained soil and surface water were observed, indicating the potential for contaminated groundwater."

L8.9 Comment noted.

August 8, 1989

L8.10

- 6) Solvent and waste oil is collected in unlined pits for storage and disposal which involves open burning. Oil contaminated water is siphoned from the pit and drained along an unlined channel to the ocean. The soil in the areas adjacent to the pit and the channel is stained by the oil, indicating subterranean seepage and possible groundwater contamination. During open burning of the waste oil, ambient air quality standards are exceeded.

L8.10 Comment noted.

L8.11

- 7) Electrical transformers and drained, and PCB contaminated oil is stored in Building 1500 "while disposal by a mainland contractor is being contemplated". Portions of this building are contaminated by oil contaminated with PCBs. Any accidental destruction of this building could result in PCB contamination of adjacent areas.

L8.11 Comment noted.

Air Quality and Noise 4.4Air Quality

L8.12

- Air pollutant emissions will increase as activity on USANA increases. Presently, "some areas downwind of both Power Plant 1 and the solid waste burning pit are predicted to exceed ambient air quality standards for CO, PM10 and NOx" (3.4.1.4). According to this document, the air quality impacts identified for Majalahin are considered to be significant: "[t]he increased in air pollutant emissions would cause or contribute to violation or would cause or contribute to exceedance of the applicable toxic air contaminant health criterion" (4.4.1).

L8.12 See revised Subsection 3.4.1.3 in Chapter 4 of this volume.

L8.13

- According to this document, monitoring and source testing should be performed to determine if air quality standards are exceeded. Several mitigation measures are recommended if it is found that a source exceeds standards. We question the rational of this plan. Already, certain air quality parameters are "predicted" to exceed standard. Why aren't mitigation measures being planned and implemented at this time?

L8.13 See the response to comment L3.31.


Conclusion

L8.14

- We find that the present problems caused by inadequate/improper waste disposal on USANA are untenable. The conditions we have identified can directly affect the health and welfare of the people who work and live on USANA; therefore, any decision to increase activities which will exacerbate the present conditions is imprudent, at best. We urge that a comprehensive plan for clean-up and proper waste handling be established and implemented prior to escalating activities at USANA.

L8.14 Mitigation plans are being developed in conjunction with the EIS and specific mitigation measures will be identified in the Record of Decision.

Thank you for the opportunity to comment on the document.

Sincerely,

 John Harrison
 Environmental Coordinator

cc: US EPA, Region IX
 L. Stephen Lau
 C. Anna Ulaszewski

L9

Dear Sir,
I am writing to request
your attention to the
KV & to the testing in
Marshall Island.

Sincerely yours,
Sybil Furber
109 Prudence Lane
Cohasset, MA 02635

L9 Comment noted.

L10

Sir:

I am opposed to the testing
of KV's over the Kwajalein Atoll
of the Marshall Islands. Such ~~testing~~ ^{short}
sight planning is contradictory to both
the environment and people. If this area
is truly infertile and should not
be on.
Betty Bunker
Wedget Ma 02635

L10 Comment noted.

L11

Winifred Milus Lubell

Aug 5 '89

L11 Comment noted.

Dear Sir:

RR1 ~~111~~, Wellfleet, Mass. 02007

I wish you to know that I strongly protest the testing of K.V.'s, especially the proposed testing planned over the Marshall Islands in the Pacific. I consider this an unnecessary threat to public health, and ecological safety of our planet.

Sincerely

Winifred M. Lubell

L12

L12 Comment noted.

I wish to protest further development and any testing of K.V.'s.

My concerns range from the immense monetary demands to our environmental concerns. I do not especially disagree with any military spending beyond the amount spent on educational programs and social spending.

W. M. Lubell

L13

Dear Mr. Col. Keglouinis:

As a Harvard Grad,
& student at M.I.T.

until the 1940s, I cut
short my studies, I
live from friends
at MIT and in the

Defense research
industry, that the
SDB program is a
fraud. And, it can

have specific deleterious
effects on the Marshall

Islands, but also,
affecting those islands

& the whole world -
polluting outer space

SPACE with weapons, in
offensive & defensive.
Sorrow - you are wrong.

Comment noted.

L13

L14

Dear Sirs:

August 3, 1989

It is outrageous and morally indefensible that the U.S. Army is proceeding with tests on a system that

- a. is technologically unfeasible
 - b. has been reported on by Congress to be ineffective and not cost efficient
 - c. is (in theory) and would be (in reality) a major threat to nuclear deterrence
 - d. and is costing the U.S. billions in funds that could be more advantageously used elsewhere.
- NO MORE SDI TESTING! Sincerely,
Amory H. Sullivan

L14 Comment noted.

L15

I am writing to object to testing of K.V. over the Birmingham staff of the Marshall Islands as part of S.D.I. development.

Claire P. Pearman
Box 333
Lincoln Ctr, MA 0173

L15 Comment noted.

L16

L16 Comment noted.

Dear Sirs:

8/2/89

I am opposed to the
testing of K's in the
Marshall Islands for
both environmental and
humanitarian reasons.

Katherine W. Brown
135 Scranton Ave.
Falmouth, MA 02540

L17

Lt. R.A. Keglarity
U.S. Army Strategic Defense Command
Montville, AL.

Comment noted.

L17

Dear Lt. Keglarity:

I am not convinced that the theoretical efficacy of the Strategic Defense Initiative has been demonstrated to the extent to justify the expense, effort and repercussions of the Killer Vehicle Test program being planned. I would appreciate your registering my opposition officially and do what you can to find more useful and interesting pursuits for the funds reserved for the proposed tests.

Sincerely,
Joel Connolly

Joel Connolly
Lower Rd.
Brewster, MA 02631

L18

NOT RECORDED

L18 Comment noted.

DEAR SIR (

I AM WRITING TO YOU AS A MEMBER
OF THE "WOMEN'S INTERNATIONAL LEAGUE
FOR PEACE AND FREEDOM" (W.I.L.P.F.)

WE ARE OPPOSING ANY GO AHEAD ON
TESTING OF "KILL VEHICLES"

WE ARE SURE THERE WILL BE AN ADVERSE
IMPACT ON THE ENVIRONMENT - AND OF COURSE
A WASTE OF THE TAXPAYERS MONEY - JUST
A NEGATIVE WASTE!

Sincerely

BARBARA McQUEE
WELLFLEET, MA 02667



L19

L19 Comment noted.

Women's International League for Peace and Freedom

United States Section • 1213 Race Street • Philadelphia, PA 19107 1891 • (215) 563 7110

July 3, 1977

NATIONAL PRESIDENT
Anne Rice

EXECUTIVE DIRECTOR
Anne Rice

VICE PRESIDENTS

Ann Glick

Spate Pugh

Anne Flaherty

EXECUTIVE DIRECTOR

Administrative Office

1010 U Street SE

Washington, DC 20003

202 544 2211

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Barbara Berman

Barbara Berman

Barbara Berman

Barbara Berman

Barbara Berman

Barbara Berman

U.S. Army Strategic Defense Command
Huntsville, Alabama

Dear LTC Ronald A. Kervlovits,

This is to inform you that, as part of the public comment on the draft Environmental Impact Statement, the "U.S. Section of the Women's International League for Peace & Freedom is opposed to the testing of so-called "kill vehicles" over the Kwajalein Atoll of the Marshall Islands.

During the WILPF's recent international congress in Sydney, Australia, I had the opportunity to talk with women from various Pacific Islands about their concerns and experiences. It is now more clear than ever that no legitimate U.S. security needs require the kind of testing proposed, especially considering the grievous toll to both human health and safety and the physical environment in areas in which testing has occurred over the past forty-plus years.

It is long past time to halt such testing and pursue the concept of common security in a global community.

In peace,

Mary Zepher

Mary Zepher
President, U.S. Section

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington D.C. 20230

Office of the Chief Scientist

August 8, 1989

L20

U.S. Army Strategic Defense Command
Attention: CSSD-H-SSP (LTC Ronald A. Keglovits)
P.O. Box 1500
Huntsville, Alabama 35807-3801

Dear Sir:

This is in reference to your Draft Environmental Impact Statement on the Proposed Actions at U.S. Army Kwajalein Atoll (USAKA), Republic of the Marshall Islands.

We hope our comments will assist you. Thank you for giving us an opportunity to review the document.

Sincerely,

David Cottingham

David Cottingham
Director
Ecology and Environmental
Conservation Office

Enclosure





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region
300 S. Ferry Street
Terminal Island, CA 90731

L20
Cont.

August 4, 1989 F/SWR13:JJN

U.S. Army Strategic Defense Command
Attention: CSSD-H-SSP (LTC Ronald A. Keglovits)
P.O. Box 1500
Huntsville, Alabama 35807-3801

Dear Sir:

NOAA Fisheries, Southwest Region has reviewed The Draft
Environmental Impact Statement (DEIS), Proposed Actions at U.S.
Army Kwajalein Atoll (USAA), Republic of the Marshall Islands.

In order to provide as timely a response to your request for
comments as possible, we are submitting the enclosed comments to
you directly, in parallel with their transmittal to the
Department of Commerce for incorporation in the Departmental
response. These comments represent the views of the Southwest
Region. The formal, consolidated views of the Department should
reach you shortly.

Sincerely yours,

E.C. Allerton
E.C. Allerton
Regional Director

cc: F/SWR13, Naughton



NOAA Fisheries, Southwest Region DEIS Comments

The Draft Environmental Impact Statement (DEIS), Proposed Actions at U.S. Army Kwajalein Atoll (USAKA) has been received by NOAA Fisheries, Southwest Region for review and comment. The DEIS has been reviewed and the following comments are offered for your consideration.

General Comments

NOAA Fisheries was consulted during the planning stages of the proposed project and during development of the DEIS. This included participation in the project scoping meeting, consultation under Section 7 of the Endangered Species Act, discussions with individuals preparing various portions of the DEIS, and site inspections of specific areas of Kwajalein Atoll. Resources for which NOAA Fisheries' bears a responsibility and alternatives to reduce adverse impacts on these resources have been for the most part addressed to our satisfaction in the document.

The Proposed Action alternative is to provide test range facilities and support services at USAKA for continuing research, development, operational space track missions, and Strategic Defense Initiative (SDI) activities. The primary concern of NOAA Fisheries is the anticipated necessity to increase dredging and quarrying adjacent to specific islands in Kwajalein Atoll to accommodate the required USAKA facilities. We believe these activities should be minimized and, when conducted, all mitigation measures proposed in the DEIS should be made mandatory. Our observations support the statement in the DEIS that quarries dredged on the ocean reef flat, if properly located, shaped, and of appropriate depth, create habitat supporting a greater diversity and abundance of marine biota than found in the surrounding sparsely populated ocean reef flat. We strongly recommend that all additional quarries at USAKA be designed to meet the specifications detailed in the DEIS to maximize new habitat.

NOAA Fisheries is also concerned about the increase in recreational diving at USAKA under the Proposed Action, and the impact this may have on the giant clam (*Tridacna gigas*). Collecting pressure from recreational divers could wipe out the remaining giant clam population at Kwajalein Atoll. Consequently, we concur with the mitigation measures proposed in the DEIS and particularly recommend the proposed prohibition on taking giant clams at USAKA.

L20.1

This comment is noted and will be considered in the decisions about mitigation contained in the Record of Decision.

L20.2

This comment is noted and will be considered in the decisions about mitigation contained in the Record of Decision.

L20.1

L20.2

Specific Comments

3.6 MARINE BIOLOGICAL RESOURCES

Reef Fishes

L20.3

Page 1-71, paragraph 2. The statement is made in this section that "The reef fishes of Kwajalein Atoll include 239 species and 46 families of bony fish and 9 species and 5 families of sharks and rays". In a recent checklist of fishes of the Marshall Islands the authors recorded a total of 817 species in 338 genera and 92 families (Randall, J.E. and Randall, H.A., 1987. Fishes of Eniwetok and other Marshall Islands, in: The Natural History of Eniwetok Atoll, U.S. Dept. of Energy). Consequently it is quite probable that there are considerably more than 239 species of reef fishes inhabiting Kwajalein Atoll.

L20.3 Comment noted.

L21

I am opposed to the develop-
ment and testing of the K.V.
Program.

Jean T. Colby

Box 594

N. Eastham

Ma. 02651

L21 Comment noted.

L22

L22 Comment noted.

To LTC RA Reglovitz,

I am very concerned about
the K.V. program, and
very much against its
deployment.

Sincerely

H.F. Kaplan
Waltham, Mass 02168

L23

L23 Comment noted.

I am opposed to the development
and testing of the new program.

Marie Morongell

315 Haynes Ln.

Orleans Ma

02653



United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
BOX 36096, 450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102

L24

August 3, 1989

ER89/590

Colonel Samuel M. Liberatore
Deputy for Operations
U.S. Army Strategic Defense Command
P. O. Box 1500
Huntsville, Alabama 35807-3801

Dear Colonel Liberatore:

The Department of the Interior has reviewed the Draft Environmental Impact Statement (DEIS) for Proposed Actions at U.S. Army Kwajalein Atoll, U.S. Army Strategic Defense Command, in Republic of the Marshall Islands and has the following comments.

L24.1 General Comments

The Fish and Wildlife Service (Service) has determined that the proposed activities at the U.S. Army Kwajalein Atoll installation would not affect any listed, candidate, or proposed endangered or threatened plants or animals under the Service jurisdiction. Both botanical and ornithological surveys of the Kwajalein Atoll islets under control of the U.S. Army were completed by Service biologists in 1988.

Specific Comments

L24.2 Island Flora. Pages 4-24 to 31. As stated in the DEIS, the small stands of remnant native broadleaf forest on Omelek Island may be adversely affected by the construction and operation of the proposed missile launching facility. The Service recommends that the missile facility on Omelek Island be designed to avoid the removal of remnant native broadleaf forest. In addition, the final document should thoroughly address impacts to the native forest from fires accidentally started by launching missiles and from the chemical washdown at the launch pad.

Birds and Other Island Fauna. Pages 4-32 to 34. The construction of a missile facility on Omelek Island may destroy nest sites or disturb nesting activities of seabirds. Depending on several

L24.1 Comment noted.

L24.2

As noted in Subsection 4.5.1.2 of the DEIS, USAKA range safety procedures require the maintenance of a clearance zone around launch pads to minimize the risk of fire at launch. The risk of fire to the stand of trees located near the proposed launch site should be reduced to minimal levels by the observation of these standard safety procedures. See also Subsection 4.5.1.4 of the DEIS for a discussion of the mitigation measures.

Chemical washdown of launch pads is not currently practiced at USAKA and it is not anticipated that chemical washdown will be used for future launches. Subsection 4.5.1.4 of the DEIS discusses mitigation measures, including neutralization and containment, for chemical washdown if it is used in the future.

L24.3 factors which include the location of the launch site, the frequency of launches, and the season of the year when launches are conducted, seabird nesting activities may be disrupted. As mitigation measures are not discussed in the DEIS, they need to be addressed in the final document to minimize or avoid impacts to seabirds. Even though only a few black-naped terns were observed on Omelek Island, the Service recommends relocating the launch facility to avoid disturbances to seabird colonies.

L24.4 Summary Comments

The construction activities on Kwajalein, Meck, and Roi Namur Islands are not expected to have major impacts to native forest and seabird habitats.

As recommended in the Services' report for the botanical and ornithological surveys conducted on Kwajalein Atoll, we recommend that the remnant native forests on Eniwetak and Legan Islands be preserved. If impacts to native forest and seabird habitats on Omelek Island from the construction and operation of the missile facility cannot be fully avoided, we recommend that portions of Eniwetak and Legan Islands be designated and managed as nature preserves in perpetuity by the U.S. Army and the Republic of the Marshall Islands.

Thank you for the opportunity to review this document.

Sincerely,


Patricia Sanderson Port
Regional Environmental Officer

ccs: Director, OEPR (w/orig. incoming)
Reg. Dir., FWS

L24.3 The biological survey of the USAKA islands that formed the basis for the discussion of island birds in the DEIS (Clapp, 1988) did not actually observe any nesting seabirds in the vicinity of the proposed launch facilities on Omelek; the survey observed some seabirds resting on the island, which suggested that nesting might also take place during certain periods of the year. No significant impact of launch activities on nesting seabirds is predicted since there are no known colonies of seabirds at Omelek Island. Before any construction activities begin at Omelek, the construction area will be surveyed for bird nests and efforts will be made to avoid potential bird nesting sites. See also revised Subsection 4.5.2.4, Mitigation, in Chapter 4 of this volume.

It should also be noted that other USAKA islands where no launch activities are planned, including Legan and Eniwetak Islands, have established colonies of seabirds. Eniwetak Island, another of the USAKA islands, is not inhabited, has no USAKA equipment or activities, and is effectively maintained in a natural state. In addition to the USAKA islands, there are dozens of other islands at Kwajalein Atoll; the non-USAKA islands located within the Mid-Atoll Corridor are uninhabited and unused for most of each year.

L24.4 As stated in Subsection 4.5.1.4 of the DEIS, mitigation measures are available that can minimize potential impacts to native forest at Omelek. See also the response to comment L24.3 and revised Subsection 4.5.2.4, Mitigation, in Chapter 4 of this volume.

L25

Comment Sheet

DRAFT ENVIRONMENTAL IMPACT STATEMENT
PROPOSED ACTIONS AT U.S. Army Kwajalein Atoll

You may use this sheet to make your comments on the Draft Environmental Impact Statement for Proposed Actions at U.S. Army Kwajalein Atoll.

L25.1 Construction buildings resources needed for

for good - clean, low be obtained from
mostly island facilities in the Marine
from the Palau Development Center, 12

L25.2

They will give advice
Any damage done to the land while
doing it should be minimal, but
could be avoided if we be transported to
avoid any damaged area. Similar (as)
through the area being considered in
open field, Guam where the Navy
collected destroyed a large section of the
reef. Advice can be obtained from
Dr. Robert R. R. R. of the Navy at
Guam Marine Lab

L25.1 See the response to comment M1.

L25.2 Comment noted.

Please give your name: Chad Wyle

Address: University of Guam Marine Laboratory
106 St. Mary's, Guam 96923

Affiliation (if any):

Note: Written comments may also be sent to:

Commander, U.S. Army Kwajalein Atoll
Attn: CS50-M
Post Office Box 26
APO San Francisco 96355-2526

Do you want a copy of the Final Environmental Impact Statement?

☒ Yes ☐ No

Chapter 4 ADDITIONS AND REVISIONS TO THE DEIS

This chapter contains material that amends or supplements the DEIS. For some items, this information reflects data that became available after the DEIS was prepared; for others, it reflects information provided by commenters or data that were developed in response to comments. This chapter is organized to match corresponding sections of the DEIS and should be used in conjunction with that volume.

1.4 SCOPE OF THIS DEIS

Section 1.4 (page 1-9), is revised with the addition of the following paragraph following the first paragraph:

All environmental controls and standards imposed by Title I, Article VI, of the Compact of Free Association have been applied in developing this EIS. As envisioned in the Compact, USAKA is engaged in the development of specific standards to address the environmental issues applicable to USAKA in conjunction with the U.S. Army Corps of Engineers, the U.S. Department of State, and the U.S. Environmental Protection Agency, Region IX. With the adoption of appropriate mitigations and the finalization of the specific standards, the Army believes that full compliance with the applicable U.S. environmental standards will be achieved. Adoption of these standards will be accomplished in consultation with the Government of the Republic of the Marshall Islands. Until these alternate standards are established, standards substantively similar to all applicable U.S. environmental laws will be applied at USAKA.

2.1 INTRODUCTION

In the second bulleted item, second sentence, revise the number of major construction projects from five to four. In Table 2.1-1 under the column heading "Change of Duration Alternative," change the first item to read:

Same as Proposed Action except HEDI operations delayed 5 years.

2.2 NO-ACTION ALTERNATIVE

Subsection 2.2.5, Employment and Population (page 2-25), is revised with the addition of the following sentence at the end of the page:

In mid-1989, the indigenous workforce at USAKA dropped to 930 (including 140 at one-half time) as a result of budgetary constraints unrelated to the Proposed Action.

2.3 PROPOSED ACTION

Subsection 2.3.2.6, Mid-Course Sensors Experiment (MSX) (page 2-44), is replaced with the following paragraph:

The MSX would involve the launch of a satellite from Vandenberg AFB to observe targets launched into suborbital flight from the Pacific Missile Range Facility at Barking Sands, Kauai. The mission, scheduled for the first quarter of 1992, would provide data about ICBM mid-course flight as well as phenomenology data. USAKA would provide sensing and tracking. No construction or modification of USAKA facilities would be required.

Subsection 2.3.3.2, Sewage Treatment Plant, Roi-Namur (page 2-50), is revised by the deletion of the words "secondary treatment" in the first paragraph and by the addition of the following text after the end of the first sentence:

An alternate waste treatment standard is being developed for USAKA in consultation with the U.S. State Department, EPA, USAKA, and the RMI. With approval of the alternate standard, the Roi-Namur sewage treatment plant is proposed to be designed to achieve primary treatment, with screening and discharge through the existing outfall, which would be extended to a depth of no less than 30 feet.

Subsection 2.3.3.4, Housing Projects (page 2-51), is revised by deletion of the second paragraph, titled Unaccompanied Personnel Housing Units, Kwajalein. The unaccompanied personnel housing project has been withdrawn as part of the Proposed Action for this EIS. The new conceptual design is for a single 400-unit structure. The new design is not

sufficiently developed to permit environmental evaluation in this EIS. The reference to Unaccompanied Personnel Housing should be deleted from Figure 2.3-2.

2.5 COMPARISON OF ALTERNATIVES AND MITIGATION

Section 2.5, Comparison of Alternatives and Mitigation is revised by the addition of the following paragraph at the end of the first full paragraph on page 2-55:

The No-Action Alternative is the environmentally preferred alternative. It must be noted, however, that all but three of the twelve significant negative environmental impacts that were identified in the EIS already exist and would continue to exist under the No-Action Alternative. These negative impacts have the potential for greater stress on the environment under the Proposed Action or Change of Duration Alternatives. Mitigation measures identified in the EIS have the potential to avoid or reduce to insignificant levels all negative impacts.

Subsection 2.5.2, Environmental Impacts and Mitigation, under the heading Land and Sea Resources, is revised by the addition of the following after the third sentence on page 2-55:

Traces of volatile organic compounds have been found in samples of water from lens wells on Kwajalein and Roi-Namur.

Subsection 2.5.2, Environmental Impacts and Mitigation, is revised by the replacement of the two paragraphs titled Air Quality and Noise (page 2-56), with the following:

Under certain conditions (depending on the fuel used at the power plant and the direction of the wind) existing Power Plant 1 and the solid waste burn pit on Kwajalein may exceed air quality standards. Under both the Proposed Action and the Change of Duration Alternative, the increases in solid waste pit burning and power plant operations to support increased personnel would exacerbate these existing air quality impacts on Kwajalein Island. The proposed Power Plant 1A may also contribute to air quality impacts on Kwajalein Island.

Air quality impacts associated with the power plant operations on Kwajalein could be mitigated by the use of fuel with lower sulfur content, altered operations, increases in stack height, and additional air quality controls. Air quality impacts associated with the solid waste burn pit could be mitigated by the installation of a solid waste incinerator with appropriate air pollution controls.

Subsection 2.5.2, Environmental Impacts and Mitigation, under the heading Socioeconomic Conditions (page 2-59), the third paragraph is replaced with the following:

Under the No-Action Alternative, a deficit of up to 617 unaccompanied personnel housing units would occur. Under the Proposed Action, the deficit would peak at 627 units in 1991, and would continue above 620 through 1994, before falling to 587. Under the Change of Duration Alternative, the unaccompanied personnel housing shortage would be slightly lower (3 to 33 units) from 1989 to 1994, and slightly higher (8 to 25 units) from 1995 to 1998. This deficit could be mitigated by the construction of new units.

Subsection 2.5.2, Environmental Impacts and Mitigation, under the heading Socioeconomic Conditions, is revised by the addition of the following after the final paragraph on page 2-59:

In mid-1989, the level of the indigenous workforce at USAKA dropped to 930 (including 140 at one-half time). This reduction was the result of budgetary constraints at USAKA unrelated to the Proposed Action. The conclusions of the DEIS regarding jobs and employment at USAKA are not affected by this change in the size of the Marshallese workforce.

Revised Figure 2.5-1 replaces the corresponding figure in the DEIS (page 2-57).

In Subsection 2.5.2, under the heading Biological Resources (page 2-56), the following material is added at the end of the first paragraph:

Although there are no known seabird nesting sites near the proposed launch facilities on Omelek, the construction area will be surveyed for nests

Environmental Resource	No Action		Proposed Action		Change of Duration Alternative	
	Regional ¹	Local ²	Regional ¹	Local ²	Regional ¹	Local ²
Land and Reef Resources	○		○		○	
Groundwater		●		● M		● M
Marine Water Quality		●		● M		● M
Air Quality		●		● m		● m
Noise						
Island Plants				● m		● m
Island Animals				○		○
Marine Biological Resources	○		○	● m	○	● m
Rare, Threatened, or Endangered Species		●		● m		● m
Archaeological Resources		○		● m		● m
Historical Resources		○		○		○
Land Use						
Population						
Nonindigenous			○		○	
Marshallese						
Employment						
Nonindigenous			*		*	
Marshallese						
USAKA Housing	●		● M		● M	
Income/Fiscal Conditions	*		*		*	
Health, Education, Recreation						
Transportation			○		○	
Water Supply		●		● M		● M
Wastewater		●		● M		● M
Solid Waste	●		● m		● m	
Hazardous Materials/Waste	●		● m		● m	
Energy			○		○	
Aesthetics						
Range Safety						
Electromagnetic Radiation						

LEGEND

- Significant Negative Impacts
- Insignificant Negative Impacts
- m Potential Mitigation
- M Mitigation as Part of the Alternative
- * Positive Impact

Notes: Blank = No Impact
Please review the text of Section 2.5 for an explanation of the impacts and mitigations summarized here.

¹ Regional Impacts: More than one island and/or large area affected.

² Local Impacts: Only one island and/or localized effects expected.



**U.S. ARMY KWAJALEIN ATOLL
ENVIRONMENTAL IMPACT
STATEMENT**
U.S. Army Corps of Engineers

**COMPARISON OF
ALTERNATIVES, IMPACTS,
AND MITIGATION**

Figure 2.5-1

before construction begins and any bird nesting areas will be avoided to the extent possible.

3.1 INTRODUCTION

The Marshallese names given in Table 3.1-1 (page 3-2) were incorrect and are replaced with the following:

<u>Common Name</u>	<u>Marshallese Name</u>
Roi-Namur	Ruöt im Nimur
Ennylabegan	Äne-Ellap-Kan
Eniwetak	Äne-wetak
Ebeye	Epjä
Ennubirr	Äne-Bön

In addition, the traditional spelling of Kwajalein Atoll should be added:

Aelöñin Kuwajleen

3.3 WATER RESOURCES

Subsection 3.3.1, Freshwater, is revised by the addition of the following text under the heading Groundwater after the last sentence on page 3-33:

Because of the strongly seasonal distribution of rainfall on Kwajalein, the freshwater lenses undergo natural shrinkage during dry months and expansion during wet months. As the dry season progresses, the chloride concentration of pumped groundwater increases progressively. Chloride concentrations typically rise to 100 or 150 milligrams per liter (mg/L) in at least several of the wells during normal dry seasons, and may reach or exceed the potable limit of 250 mg/L during pronounced dry seasons or other drought conditions.

Degradation of groundwater that occurs during droughts tends to be reversed quickly, typically with the onset of the next wet season. The effects of multiyear droughts are longer lasting, although they are primarily caused by the lack of rainfall and natural groundwater discharge rather than overpumping. Records kept by the water system operators on Kwajalein show a fairly rapid

recovery of the groundwater system following the most serious recent drought. During the 1984 drought, chloride concentrations in production wells exceeded 150 mg/L from May to July, but decreased rapidly to 20 to 80 mg/L by September with the resumption of wet season rains. Concentrations remained below 100 mg/L throughout the period from 1985 to 1987 (William Meyer, District Chief, United States Department of the Interior, Geological Survey, Water Resources Division, letter to LTC Keglovits of the Strategic Defense Command dated July 20, 1989).

Subsection 3.3.1, Freshwater, under the heading Groundwater (page 3-34), is revised by the deletion of the first paragraph on the page. The text on page 3-34 is further revised by the addition of the following material after the second paragraph (preceding the heading Surface Water).

In June 1989, Advanced Sciences Incorporated (ASI), sampled and analyzed groundwater taken from lens wells on Kwajalein (Nos. 2, 4, 5, and 6) and Roi-Namur (Nos. 1, 2, A, B, C, and F). Samples were tested for turbidity, pH, inorganic constituents, metals, radiological substances, volatile organic compounds (VOCs), and other organic compounds, including pesticides. The organics analyses included testing for 150 organic compounds. The results of the testing indicated that most compounds were present in concentrations below the detection limits for the analytical methods used. The following discussion and Table 3.3-1a summarize exceptions where concentration of specific parameters were detected.

Of the four wells tested on Kwajalein Island, one, (Lens Well 5, located just west of the water storage tanks), showed elevated levels of total organic halides (TOX) (0.15 mg/L), while two others (Lens Well 4, located just west of the helicopter hangar, and Lens Well 6, located just south of the photo lab) showed trace amounts (0.010 µg/L). No EPA standard currently exists for TOX. Lens Well 5 also showed traces of chloroform and 1,1,1-trichloroethane (volatile organics). The amounts detected (1 microgram per liter [µg/L] of each substance) are less than the EPA National Primary Drinking Water Standards of 200 µg/L of 1,1,1-trichloroethane and 100 µg/L for total trihalomethanes (of which chloroform is one constituent).

Table 3.3-1a
SELECTED WATER QUALITY PARAMETERS
WATER QUALITY SAMPLING AT KWAJALEIN AND ROI-NAMUR ISLANDS
JUNE 1989

Island and Well	Total Organic Halides (TOX) (mg/L)	Parameter				
		Volatile Organics				
		TCE ($\mu\text{g/L}$)	PCE ($\mu\text{g/L}$)	Trans 1,2- dichloro- ethene ($\mu\text{g/L}$)	Chloro- form ($\mu\text{g/L}$)	1,1,1-tri- chloro- ethane ($\mu\text{g/L}$)
EPA National Pri- mary Drinking Water Standards	None	5.0	None*	None**	None***	200.0
Kwajalein						
LW-2	ND	ND	ND	ND	ND	ND
LW-4	0.010	ND	ND	ND	ND	ND
LW-5	0.15	ND	ND	ND	1.0	1.0
LW-6	0.010	ND	ND	ND	ND	ND
Roi-Namur						
LW-1	0.045	13.0	12.0	19.0	ND	ND
LW-2	ND	1.0	ND	ND	ND	ND
LW-A	0.013	ND	ND	ND	ND	ND
LW-B	Not tested	ND	ND	ND	ND	ND
LW-C	0.012	ND	ND	ND	ND	ND
LW-F	0.008	ND	ND	ND	ND	ND

ND = Not detected

* = Proposed EPA standard: zero $\mu\text{g/L}$

** = Proposed EPA standard: 70 $\mu\text{g/L}$

*** = The standard regulates combined total trihalomethanes (THM) at 100 $\mu\text{g/L}$

Source: ASI, 1989

Of the five wells on Roi-Namur tested for TOX, four contained TOX. Lens Well 1 on Roi-Namur showed 0.045 $\mu\text{g/L}$, while Lens Wells A, C, and F showed 0.013 $\mu\text{g/L}$ or less.

Lens Wells 1 and 2 on Roi-Namur also showed elevated volatile organics levels, indicating contamination by degreasers/cleaning solvents. The sample from Lens Well 1 (located west of the runway) contained 13 $\mu\text{g/L}$ of trichloroethene (TCE), compared with the EPA Drinking Water Standard of 5 $\mu\text{g/L}$; 12 $\mu\text{g/L}$ of tetrachloroethene (PCE); and 19 $\mu\text{g/L}$ of trans-1,2-dichloroethene. EPA currently has no drinking water standard for PCE or trans-1,2-dichloroethene; however, EPA has proposed standards of zero and 70 $\mu\text{g/L}$, respectively, for the two constituents. The sample from Lens Well 2 (located near the center of Namur) showed a TCE level of 1 $\mu\text{g/L}$.

Samples taken from six lens wells on Kwajalein Island in January 1989 also showed that there was

contamination by 1,1,1-trichloroethane in Lens Well 2. Although the level of contamination was higher than in the June study (110 µg/l), it was less than the EPA drinking water standard of 200 µg/l). Low levels of 1,1-dichloroethane, chloroform, bromodichloromethane, chlorobenzene, and bromoform were also identified.

Table 3.3-1b
SELECTED WATER QUALITY PARAMETERS
KWAJALEIN ISLAND LENS WELLS
JANUARY 1989
(µg/l)

Substance	Lens Well						EPA National Primary Drinking Water Standards
	LW-1A	LW-2	LW-7C	LW-7E	LW-8B	LW-8D	
1,1-Dichloroethane	ND	38	ND	ND	ND	ND	None ¹
Chloroform	ND	6.3	ND	ND	ND	ND	None ¹
1,1,1-Trichloroethane	ND	110.0	ND	ND	ND	ND	200.0
Bromodichloromethane	ND	6.9	ND	ND	ND	ND	None ¹
Dibromochloromethane	ND	6.9	ND	ND	ND	ND	None ¹
Chlorobenzene	ND	ND	ND	ND	ND	3.7	None ¹
Bromoform	ND	2.7	ND	ND	ND	ND	None ¹

¹The U.S. EPA standard for combined total trihalomethanes is 100 µg/l.

ND = Not detected.

Source: U.S. Army Environmental Hygiene Agency, IN: ASI, 1989.

The source of the contamination observed in the lens wells on Roi-Namur and Kwajalein is uncertain. Use of Lens Well 2 on Roi-Namur and Lens Well 2 and the aviation lens well (an unnumbered well adjacent to the northwest corner of Bucholz Field) on Kwajalein has been discontinued because of the prior discovery of contamination in the lens well and the proximity of the wells to potential sources of contamination.

Subsection 3.3.2, Marine Water Quality (page 3-35), is revised by deleting references to the second NPDES permit (No. TT0110027), which was not issued in final form.

Subsection 3.3.2, Tables 3.3-2 (page 3-38) and 3.3-5 (page 3-41), are revised to replace the Trust Territory of the Pacific Islands marine water quality standards for the following metals with amended standards: lead, zinc, copper, mercury, cadmium, arsenic, and chromium (Source: Title 63, Public Health, Safety, and Welfare; Chapter 13, Air, Land, and Water Pollution; Subchapter VII, Marine and Fresh Water Quality Standard Regulations (as amended March 31, 1986)).

Table 3.3-2
SUMMARY OF WATER QUALITY DATA ON HEAVY METALS COLLECTED FROM
KWAJALEIN ISLAND (SITES 1-5) AND ROI-NAMUR ISLAND (SITES 6-10)
BETWEEN 28 SEPTEMBER AND 12 OCTOBER 1988

<u>Standards</u>	<u>Lead (mg/L)</u>	<u>Zinc (mg/L)</u>	<u>Copper (mg/L)</u>	<u>Mercury (mg/L)</u>
EPA ^a Chronic	0.0056	0.086	0.0029	0.000025
Acute	0.140	0.095	0.0029	0.0021
TTPI ^b	0.0056	0.058	3.000	0.000025
Site 1	<0.005	<0.050	<0.001	<0.0005
Site 2	0.047	0.053	0.066	<0.0005
Site 2 dup.			0.055	<0.0005
Site 3	0.031	<0.050	0.018	<0.0005
Site 4	0.006	<0.050	<0.001	<0.0005
Site 5	0.016	<0.050	<0.001	<0.0005
Site 6	<0.005	<0.050	<0.001	<0.0005
Site 7	<0.005	<0.050	<0.001	<0.0005
Site 8	<0.008	<0.050	<0.001	<0.0005
Site 9	0.006	<0.050	<0.001	<0.0005
Site 10	<0.005	<0.050	<0.001	<0.0005
Field blank (2)	<0.005	<0.050	<0.001	<0.0005

Source: Aecos, Inc., 1988.

^aEPA Marine Water Quality Criteria, 1987.

^bTTPI = Trust Territory of the Pacific Islands, Environmental Protection Board Rules and Regulations, Public Law 4C-78 (63 TTC 501 et seq.), as amended March 31, 1986.

Note: Water quality sampling site locations are indicated in Figures 3.1-2 and 3.1-3.

Table 3.3-5
CONCENTRATIONS OF METALS DETECTED IN MARINE BIOTA AND WATER OF KWAJALEIN ATOLL
JULY TO AUGUST 1976

Site	Sample	Metals ^a					
		Cadmium	Copper	Mercury	Lead	Zinc	Arsenic
Kwajalein Dump	Fish	b	0.65	0.09	0.16	2.48	0.65
	Snails	0.99	4.27	0.08	1.52	16.71	1.14
	Crabs	0.11	58.60	b	2.11	4.52	0.8'
	Coral	0.04	0.41	0.04	2.02	3.41	3.00
	Water	b	0.043	b	b	0.056	c
Kwajalein Lagoon	Fish	b	0.41	0.09	0.15	b	0.32
	Crabs	b	40.54	b	0.09	4.68	0.16
	Coral	0.04	3.23	b	0.39	0.22	0.80
	Water	b	b	b	b	0.015	c
Kwajalein Harbor	Fish	b	0.34	0.16	0.10	1.64	0.23
	Snails	0.23	4.76	0.09	1.10	22.59	0.15
	Sponge	0.17	6.43	b	0.72	1.70	0.11
	Barnacles	0.24	4.08	0.08	0.33	16.21	0.33
	Water	b	b	b	b	b	c
Kwajalein Japanese Pools	Fish	b	0.86	b	0.37	2.47	0.57
	Snails	0.12	5.44	0.06	0.40	24.60	0.17
	Crabs	b	15.99	0.05	0.14	4.46	0.37
	Coral	0.10	3.35	b	1.68	0.24	1.09
	Sea cucumber	b	0.21	0.10	0.18	0.62	0.31
	Water	b	b	b	b	b	c
Biggerman Island	Fish (herbivore)	b	0.45	0.05	b	b	0.77
	Fish (carnivore)	0.10	0.78	0.06	0.17	19.58	0.24
	Snails	1.71	8.14	0.09	1.06	12.81	1.14
	Clams	0.59	0.87	b	b	15.32	2.54
	Crabs	2.16	18.75	b	0.23	6.95	0.23
	Coral	b	0.31	b	0.45	0.52	0.50
	Lobster	6.41	7.27	0.14	0.24	3.68	0.17
	Sponge	0.17	0.90	0.07	0.17	1.05	0.39
	Water	b	b	0.0006	b	b	c
	Water	b	b	b	b	b	c
Roi-Namur Ocean Side	Snails	0.14	5.46	b	0.17	8.96	0.44
	Coral	b	2.13	0.03	0.56	0.23	0.64
	Sponge	b	0.65	b	0.29	0.38	0.18
	Sea cucumber	b	0.56	0.04	1.06	0.51	0.19
	Water	b	0.037	b	b	b	c
Roi-Namur Dump	Fish	b	1.54	0.19	b	b	0.32
	Snails	0.57	5.95	0.04	0.76	17.23	0.30
	Clams	0.38	0.38	b	0.85	15.79	1.45
	Coral	0.14	3.50	b	1.64	3.62	0.68
	Sponge	0.09	0.27	b	0.14	0.98	0.16
	Sea cucumber	b	0.32	b	0.40	0.44	0.54
	Water	b	0.038	0.0003	b	b	c
Meck Island	Fish	b	0.44	0.07	b	0.62	0.36
	Snails	1.35	2.53	0.08	0.55	12.64	0.21
	Crabs	0.16	14.05	0.20	0.16	1.77	0.29
	Coral	0.10	1.96	b	1.12	3.24	0.49
	Water	b	b	b	b	b	c
Illeginni Island	Snails	0.19	3.35	0.06	0.57	5.62	0.46
	Crabs	b	48.43	0.04	b	4.01	0.63
	Water	b	b	b	b	b	c
Lowest detectable limit--water		0.005	0.025	0.0002	0.005	0.015	c
Lowest detectable limit--tissue		0.01	0.025	0.01	0.05	0.05	0.05
TTPI water standard ^d		.005 mg/L	3.000 mg/L	0.000025 mg/L	0.0056 mg/L	0.058 mg/L	0.01 mg/L

^aTissue levels expressed in mg/kg; water levels expressed as mg/L.

^bNot detectable.

^cAnalysis not performed.

^dSource: TTPI EPB Rules and Regulations, PL 4C-78 (63 TTC 501 et seq.), as amended March 31, 1986.

Source: U.S. Army Environmental Hygiene Agency, 1977.

Subsection 3.3.2 (page 3-37), under the heading Solid and Hazardous Waste, replace the first sentence with the following:

Tests for heavy metal concentrations of seawater samples taken off the Kwajalein and Roi-Namur dump complexes (Sites 2 and 3 in Aecos, Inc., 1988) showed levels exceeding EPA receiving water quality criteria for lead and copper and exceeding Trust Territory receiving water quality standards for lead.

Subsection 3.3.2 (page 3-42), under the heading Ocean Dumping, the last two sentences are revised:

A Memorandum of Agreement between USAKA and the U.S. EPA, prepared (in early 1989) in consultation with the RMI government, allows ocean dumping of specified bulky metallic waste.

Subsection 3.3.2.1 (page 3-45), is revised by the addition of the following text at the end of the subsection:

In June 1989, samples of ocean sediments adjacent to the oil pit/sanitary landfill area of Kwajalein Island were sampled for oil and grease, 13 priority pollutant metals, and volatile organics (ASI, 1989). As shown in Table 3.3-10, although no detectable concentrations of volatile organics were found, concentrations of oil and grease were detected at 73 to 140 milligrams per kilogram (mg/kg). Metal concentrations were elevated; in particular, Sample No. 1 showed concentrations of 13,600 mg/kg of copper, 6,600 mg/kg of lead, and 1,680 mg/kg of zinc.

Table 3.3-10
OCEAN SEDIMENTS COLLECTED AT KWAJALEIN ISLAND
METALS AND OIL AND GREASE RESULTS
(mg/kg)

Parameter	Samples		
	Ocean Sediment No. 1	Ocean Sediment No. 2	Ocean Sediment No. 3
Silver	3.7	ND	1.1
Arsenic	77.1	ND	9.1
Beryllium	ND	ND	ND
Cadmium	32	ND	4.3
Chromium	108	3.6	29.2
Copper	13,600	27.5	736
Mercury	1.8	ND	ND
Nickel	114	ND	19.4
Lead	6,600	9.6	2,960
Antimony	39.6	ND	4.8
Selenium	ND	ND	ND
Thallium	ND	ND	ND
Zinc	1,680	16.6	149
Oil and Grease	73	130	140

Note: ND = Not detected.

Source: ASI, 1989.

The ocean sediments were analyzed for hazardous waste EP (extraction procedure) toxicities. This analysis showed that the metal concentrations are not easily extractable (leachable) from the sediments, and in all cases, did not exceed the EP toxicity values.

Three samples were tested for the presence of 13 priority pollutant metals that could be deposited by boat sandblasting operations. As shown in Table 3.3-11, the first sample (sandblast grit) was taken at the sandblasting area. The second sample was taken from ocean sediments near the end of the dry-dock area in the harbor marina, and the third sample was taken from ocean sediments adjacent to the barge slip ramp dock.

Table 3.3-11
GRIT SAMPLES COLLECTED AT KWAJALEIN ISLAND
METALS RESULTS
(mg/kg)

Parameter	Samples		
	Sandblast Grit	Ocean Sediment Marina	Ocean Sediment BSR Dock
Silver	2.4	ND	ND
Arsenic	193	36.9	54.7
Beryllium	ND	ND	ND
Cadmium	37.3	7.2	9.0
Chromium	289	319	45.6
Copper	4,800	654	994
Mercury	ND	ND	ND
Nickel	23.3	112	5.0
Lead	700	347	362
Antimony	40.0	3.8	5.4
Selenium	ND	ND	ND
Thallium	ND	ND	ND
Zinc	2,070	431	270

Note. ND = Not detected.

Source: ASI, 1989.

The sandblast grit sample showed elevated levels of several metals--particularly chromium, copper, lead, and zinc. The ocean sediments generally showed lower levels of the same metals. The metal concentrations were compared with EP toxicity levels; this comparison showed that the metal concentrations in all three samples do not exceed EP toxicity values provided under the Resource Conservation and Recovery Act (RCRA).

USAKA's Chief Medical Officer and the Army Environmental Hygiene Agency, in consultation, evaluated the available data on metal concentrations in marine waters and sediment (including the ASI data) and concluded that the levels observed pose no health risk. Nonetheless, USAKA has initiated further testing of metal levels in tissues and water column samples to characterize more definitively the distribution and sources of the metal contamination.

3.4 AIR QUALITY AND NOISE

Subsection 3.4.1.3, Existing Air Pollution Sources (page 3-50), is revised by the following addition at the end of the second paragraph:

A short-term ambient air quality monitoring program was performed over a 3-day period, June 13 to 15, 1989, at Kwajalein. The primary purpose of the monitoring program was to measure the influence of the solid waste burn pit on air quality. Samples were collected downwind of the burn pit. Some measurements were made at the Kwajalein junior/senior high school to obtain background air quality data during the same time frame (ASI, 1989).

Monitoring data were collected for meteorology, nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter (PM_{10}), sulfur oxides (SO_x), lead, hydrogen chloride (HCl), and volatile organic compounds (VOC). Because of the short-term nature of the program, monitoring data are representative of the time and location of the samples collected only. During the monitoring program, air quality at the school was well below ambient air quality standards. No exceedances of ambient standards were measured downwind of the burn pit, but the monitors were not directly downwind the entire time. Concentrations of PM_{10} and CO were high enough at the burn pit to indicate that standards potentially could be exceeded at close-in locations under worst-case burning and meteorological conditions. In addition to combustion emissions, ash handling practices were found to be a significant source of PM_{10} emissions (ASI, 1989).

Subsection 3.4.1.4, Ambient Air Quality (page 3-53), is revised by the following addition at the end of the first paragraph:

Stack test emission measurements were made at Power Plant 1, Power Plant 2, and the solid waste burn pit on Kwajalein and at the Roi-Namur Power Plant. Measurements of PM_{10} , NO_x , CO , and SO_2 , and VOC emissions were taken from one engine at each power plant.

Results from the power plant stack tests indicated that except for SO₂, emissions are about the same, although slightly lower than the emission rates used in the DEIS modeling analysis. The sulfur content in the fuel was 1 percent for the test. The modeling analysis was based on 0.25 percent sulfur fuel. Therefore, measured SO₂ emissions were greater than modeled in the DEIS (ASI, 1989). Burn pit emissions were found to be greater than the emissions modeled in the DEIS.

Although stack test results were inconclusive, they suggested that exceedances of NO_x standards may not occur downwind of Power Plants 1 and 2, but that use of 1 percent sulfur fuel could produce elevated SO₂ levels around the power plants (ASI, 1989). Predicted exceedances of air quality standards downwind of the burn pit would be greater than projected in Table 3.4-3 using the larger emission rate measured in the stack test program.

Stack testing results support conclusions reached in the DEIS about the potential for air quality standard exceedances downwind of the burn pit.

Subsection 3.4.2, Noise (page 3-54), fifth paragraph, is modified by replacing the second sentence with the following:

Measurements of existing noise levels are available only on Kwajalein Island. Therefore, the descriptions of the affected environment are primarily based on knowledge and modeling of existing noise-generating activities.

On page 3-57, first paragraph, after the first complete sentence, add:

Limited onsite noise monitoring data were available for Power Plant 1 (ASI, 1989).

The next two sentences should be deleted and replaced with:

These data show the 65-dBA DNL contour caused by Power Plant 1 to be about 1,300 feet from the plant. There are no noise-sensitive land uses within this area.

3.12 UTILITIES

Subsection 3.12.1.1, Potable Water Systems, is revised under the heading Kwajalein by the addition of the following text at the end of the third paragraph on page 3-160:

USAKA has begun the installation of new filtration equipment and has initiated work to link "dead-end" mains of the potable water distribution system in order to improve circulation.

Subsection 3.12.1.1, Potable Water Systems, is revised under the heading Treated Water Quality (page 3-160) with the addition of the following at the end of the text:

In June 1986, the U.S. Army Pacific Environmental Health Engineering Agency (EHEA) reviewed results of water quality sampling from 1983 through mid-1986 (Water Quality Engineering Special Study: Project No. 31-91-0500-86). The EHEA characterized USAKA's drinking water as of high quality and within primary and secondary drinking water standards, except for marginal turbidity values. The somewhat high turbidity was not predicted to have any direct adverse health effects.

In 1989 USAKA began a new program of water quality monitoring in conformance with the monitoring requirements of the U.S. National Primary Drinking Water Standards. The new monitoring included testing for constituents that had not been tested for in the past. In January 1989, the Army Environmental Hygiene Agency (AEHA) collected and analyzed samples from the drinking water systems on Kwajalein, Roi-Namur, Meck, and Ennylabegan Islands.

The samples were taken from the distribution system subsequent to treatment. Inorganic constituents were within normal concentrations. On Kwajalein total organic carbon (TOC) and total organic halide (TOX) were slightly elevated. The TOC may be associated with algal activity in the raw water storage tanks. The source of the TOX is probably associated with Lens Well 5 as discussed in revised Subsection 3.3.1. Turbidity was within the range of 0.92 (Meck) to 2.3 (Kwajalein). These values exceed those under the proposed Safe Drinking Water Act (SDWA) for surface sources.

Volatile organic compounds were generally found to be below the detection limits. The SDWA limit for trihalomethanes (THMs) of 100 micrograms per liter ($\mu\text{g/L}$) is exceeded in the drinking water on Kwajalein. The results of the THM analysis for the indicated islands are summarized in Table 3.12-1a.

Table 3.12-1a
SUMMARY OF TRIHALOMETHANE ANALYSIS FOR USAKA

<u>Parameter</u>	<u>Kwajalein</u>	<u>Roi-Namur</u>	<u>Meck</u>	<u>Ennylabegan</u>
<u>Trihalomethanes ($\mu\text{g/L}$)</u>				
Chloroform	55.0	15.0	2.6	22.0
Bromodichloromethane	40.0	4.7	1.0	4.5
Dibromochloromethane	28.0	1.0	0.9	1.7
Bromoform	<u>6.7</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>
Total THMs*	129.7	20.7	4.5	28.2

*U.S. EPA standard for THMs is 100 $\mu\text{g/L}$.

Source: U.S. Army Environmental Hygiene Agency, in: ASI, 1989.

THMs are produced during chlorination of the water. The extent of THM production is related to chlorine concentration, water temperature, pH, contact time, and presence of precursor compounds (i.e., organic material such as humic acids). Decomposition of vegetation releases humic substances that are the likely source of the precursors. The water system on Kwajalein requires a relatively high chlorine concentration to maintain a residual throughout the system.

Chloroform has been shown to be a carcinogen in animal studies at high dose levels; the other THMs are mutagenic in bacterial tests. Chloroform and the other THMs have been present in water supplies for as long as chlorine has been used as a disinfectant because of its reaction with the precursors.

Maximum contaminant levels (MCLs) are established based on a level of exposure considered to constitute a negligible incremental lifetime risk (approximately one in one million) based on a conservative risk estimate calculation procedure. A lifetime of 70 years and a 2-liter of water per

day consumption rate is used in the risk assessment analysis. The existing MCL for THMs is 100 µg/L. U.S. EPA is currently evaluating scientific data regarding THMs. Use of an alternative disinfection method and/or treatment process may be required.

Subsection 3.12.2, Wastewater Collection, Treatment, and Disposal, under the heading Kwajalein, is revised by the addition of the following text after the fourth paragraph on page 3-162.

Although the influent to the Kwajalein Island treatment plant is primarily domestic wastewater, a number of nondomestic sources also reach the plant. Nondomestic sources include sinks and drains at the aircraft maintenance shops, the automotive shops, the photographic laboratory, the calibration laboratory, the dry cleaning shop, the base engineering services shops, the marine terminal shops, the Recreation Services crafts shops, the high school chemistry laboratory, the hospital laboratory, and the dental clinic laboratory. Wastes from the photographic laboratory are pre-treated for silver recovery before entering the wastewater system.

In the same subsection under the heading Roi-Namur, the following sentence is added at the end of the paragraph:

Nondomestic sources of wastewater include sinks and drains at the maintenance shops.

Subsection 3.12.3.1, Municipal Waste, is modified by replacing the first sentence of the first full paragraph on page 3-164 with the following:

In mid-1989, USAKA and the U.S. Environmental Protection Agency, in consultation with the RMI government, entered into a Memorandum of Agreement to allow once more the ocean disposal of certain bulky, metallic waste.

The last sentence of the same paragraph is replaced with the following:

Septage is buried in excavated pits on Roi-Namur. Septage from Meck and Ennylabegan is transported to Kwajalein to be processed through the wastewater treatment plant.

Subsection 3.12.3.2, Construction Solid Waste Storage and Disposal is revised by the addition of the following sentence after the first sentence on page 3-165:

Asbestos is no longer buried in landfills at USAKA and the process of identifying existing areas within landfills that contain asbestos has begun.

Subsection 3.12.4.1, Hazardous Materials (page 3-167), fifth paragraph is revised by the addition of the following sentence immediately before the last sentence.

The traces of organic halides and volatile organic compounds found in lens wells on Roi-Namur and Kwajalein (see revised Subsection 3.3.1) suggest that some contamination has occurred.

Subsection 3.12.4.1, Hazardous Materials (page 3-167), is also revised by the addition of the following text after the fifth paragraph:

There are seven lens wells on Kwajalein. The sanitary landfill and supply disposal area (shown in Figure 3.12.1) are located within approximately 1,000 feet of Lens Well 6, suggesting that groundwater could be affected by releases from the landfill. Lens Wells 2 and 5 are each located within approximately 1,000 feet of the fuel storage area. The remaining wells are located along the airfield taxiway and runway. Research and development operations and supply activities are located within 800 feet of both sides of the runway, indicating some potential for groundwater contamination as a result of accidental releases from these areas. Potential accidental releases would be mitigated by the use of containment curbs within these operations areas.

There are five lens wells located along the northwest side of the airfield runway on Roi-Namur. The sanitary landfill (Figure 3.12.2) on Roi-Namur is located approximately 1,300 feet southwest of these wells. The proximity of the landfill to these wells suggests that groundwater potentially could be affected by releases from the landfill.

these wells suggests that groundwater potentially could be affected by releases from the landfill.

The potential for groundwater contamination resulting from releases of hazardous materials is significant. Hazardous materials stored or dispensed near lens wells or in recharge areas for groundwater have the potential to contaminate the drinking water supply as a result of spills or inadequate handling practices. Further, insufficient controls over disposal of hazardous materials could result in migration of these materials to drinking water sources. Some of these materials are specifically regulated under the Safe Drinking Water Act and, if released to drinking water sources, could contaminate the already inadequate supply of drinking water on Kwajalein and Roi-Namur Islands. These substances, such as trichloroethene and 1,1,1-trichloroethane, are toxic and would present a health hazard if found in elevated concentrations in the drinking water.

Although no such substances have been detected in the drinking water distribution system, they have been found in Lens Wells 2 and 5 at Kwajalein (see Tables 3.3-1a and 3.3-1b [in Chapter 4 of this volume]). Elevated levels in the range of 1 to 19 µg/L have been detected in Lens Wells 1 and 2 on Roi-Namur. The presence of these substances, even in low levels in the lens wells, is indicative of a pathway from the storage and/or dispensing areas to the groundwater.

Subsection 3.12.4.2, Hazardous Waste, is revised by the addition of the following text at the bottom of page 3-168:

In mid-1989 USAKA began implementing new practices for hazardous waste handling. A Hazardous Materials Management Committee has been established, which includes representatives of USAKA, the prime logistics/engineering contractor, and other key contractors. Its purpose is to establish and implement procedures for improved hazardous materials and waste management practices, and to identify and handle existing hazardous wastes in conformance with applicable regulations.

A USAKA environmental point-of-contact and an environmental engineer position have been established. Key USAKA personnel are being provided

training in solid waste and hazardous materials and waste handling. The first steps of a waste inventory have begun and locations and estimated quantities of materials have been identified. The final waste inventory and management plans are currently being developed. A USAKA Standard Operating Procedure is being developed for the dispensing and collection of oils and other hazardous materials. USAKA has obtained a hazardous waste generator number from EPA.

Instructions have been issued that require the segregation of waste oils and solvents at the generation source. Burning of waste oil in open pits is no longer practiced; waste oil is currently being transferred into drums for characterization and disposal. Batteries are now drained and neutralized. Spent battery casings are no longer land-filled but are segregated for proper disposal. Asbestos is no longer disposed of in USAKA landfills, and a number of existing asbestos-containing areas in the landfills have been identified for cleanup. Other hazardous waste is now separated from solid waste at the Kwajalein landfill. A facility has been identified for use as a temporary staging and storage area for hazardous waste.

All PCB-contaminated materials stored at Building 1500 on Kwajalein have been shipped to the United States for proper disposal. Plans are being developed to decontaminate the areas of Building 1500 that had been contaminated. A PCB storage facility that conforms to standards is being constructed and is scheduled to be completed by July 1990.

3.15 ELECTROMAGNETIC RADIATION ENVIRONMENT

The following sentence is added at the end of the first paragraph on page 3-190:

Information about potential effects on humans of existing and proposed radars, other than the body heating effect, is provided in revised Subsection 4.15.2.

Table 3.15-1 (page 3-192), is revised by the addition of the following line showing pulse repetition frequencies (modulation) of the USAKA radars with established hazard zones:

ALCOR: 38 to 203 pulses per second

ALTAIR: VHF Waveforms: 20 to 1,724 pulses per second

UHF Waveforms: 50 to 3,100 pulses per second

TRADEX: L-Band: 110 to 1,500 pulses per second
S-Band: 100 to 1,500 pulses per second

MMW: 50 to 2,000 pulses per second

AN/FPQ-19: 160 pulses per second

AN/MPS-36: 160, 320, and 640 pulses per second

SDRs: 1,805, 3,003, and 3,620 pulses per second

Source: U.S. Army Strategic Defense Command:
USAKA Range Instrumentation and Support Facilities Manual. (1 October 1988).

The operating frequency and modulation of the proposed GBR-X radar are classified information.

4.3 WATER RESOURCES

Subsection 4.3.1.1, No-Action Alternative (page 4-5), is revised by the addition of the following sentence at the end of the first paragraph:

Traces of volatile organic compounds found in several lens wells on Kwajalein and Roi-Namur indicate a contamination pathway from storage/dispensing areas to the groundwater. (See revised Subsection 3.3.1, Freshwater).

Subsection 4.3.1.2, Proposed Action (page 4-5), is revised by the addition of the following sentence after the first paragraph:

The increased population and higher level of mission activities would increase the risk of ground-

water contamination by hazardous materials and wastes.

Subsection 4.3.1.2, Proposed Action (page 4-5), is also revised by replacing the last sentence of the third paragraph with the following:

Although the groundwater system at Kwajalein is fairly resilient and has little long-term (multi-year) "memory," it does undergo fairly rapid depletion in the absence of rain. In conjunction with drought conditions, the increased demand for potable water could cause chloride levels to rise above 150 mg/L temporarily.

Subsection 4.3.1.4, Mitigation (page 4-6), is revised by the addition of the following sentence at the end of the paragraph:

Mitigation for the increased risk of groundwater contamination by hazardous materials and waste and for the overpumping of the lens wells would be implementation of the improved waste handling practices (described in Subsection 4.12.4.4) and by the continuation of the monitoring program implemented by USAKA in mid-1989.

Subsection 4.3.2.2, Thermal Discharges (page 4-8), is revised by the addition of the following after the second paragraph:

The proposed 150,000-gpd desalination facility will use waste heat from the new Power Plant 1A. Saltwater will be used to cool the diesel engines that power the electrical generating equipment. Heat will be extracted from the waste saltwater stream prior to its discharge back into the lagoon through the existing 24-inch outfall (Figure 3.12.1). The total dissolved solids of the saltwater (brine) will increase by about 10 percent in its single pass through the desalination system (an increase from about 34 parts per thousand [ppt] to about 37.4 ppt). Dissolved solids levels above 38 ppt can occur naturally in tidal pools and in some open ocean environments. Given the modest increase in salinity and the fact that the saline effluent will be quickly diluted to ambient levels, no measurable biological effect is expected.

In the same subsection (4.3.2.2), under the heading Sewage (page 4-8), the second paragraph is revised by the addition of the following:

An alternate waste treatment standard is being developed for USAKA in consultation with the U.S. State Department, EPA, USAKA, and the RMI. With approval of the alternate standard, the Roi-Namur sewage treatment plant is proposed to be designed to achieve primary treatment, with screening and discharge through the existing outfall, which would be extended to a depth of no less than 30 feet. Analysis of the proposed design states, "The recommended improvements [are] not anticipated to result in significant adverse impacts to the marine environment. ... There should be no discernable impact as a result of the wastewater discharge outside of the immediate area of the outfall. The coastal waters in the project area have excellent circulation and flushing characteristics and the prevailing current results in a rapid net transport away from the island." (Sea Engineering, 1989).

In the same subsection, under the heading Solid Waste (page 4-9), the first paragraph is revised by replacing the last sentence with the following sentence:

Heavy metal levels in seawater could continue to exceed EPA receiving water quality standards for lead and copper and Trust Territory receiving water quality standards for lead.

Subsection 4.3.2.4, Mitigation (page 4-10), is revised by the addition of the following paragraph at the end of the text under the heading Solid Waste:

If new data indicate a more serious contamination problem, mitigation measures could include a ban on the consumption of fish taken near the contaminated areas. An additional measure (which could have some risk of spreading the contamination) would be the dredging and disposal of contaminated sediments.

4.4 AIR QUALITY AND NOISE

Subsection 4.4.1.2, Proposed Action (page 4-15), is revised by the addition of the following sentence at the end of the text under the heading SO₂:

Use of 1 percent sulfur fuel (used in mid-1989 at Power Plant 1) could produce elevated SO₂ levels around the power plants (see revised Subsection 3.4.1.4).

Also in Subsection 4.4.1.2, the following text is added after the first full paragraph on page 4-20:

Since the beginning of recorded history, sea level has changed so slowly that, for practical purposes, it has been constant. However, sea level was rising about 3 feet per century from 15,000 to 5000 B.C. In the last century, tidal gauges have indicated that sea level has risen about 30 centimeters (cm) (1 foot) relative to most of the U.S. coast. Studies combining these measurements to determine global trends have concluded that the average worldwide sea level has risen 10 to 15 cm (4 to 6 inches) in the last 100 years.

Hoffman et al. (1986) have estimated sea level rise for specific years. Their projections indicate sea level rises of from 3.5 to 5.5 cm will occur by the year 2000, which is within the time frame of this project. By the year 2100, sea level rise may be as high as 368 cm.

All of these projections are based on theories of a series of complicated feedback mechanisms. There is considerable uncertainty regarding the impact of a doubling of greenhouse gases. Based on the absorption of infrared radiation, a doubling of these gases would result in a rise of the earth's temperature of 1.2°C, if no other factors changed. However, raising the earth's temperature may increase evaporation, which could result in increased cloudiness that would reflect incoming solar radiation and eventually decrease temperature. Because of this, any increase in sea level that might result from possible global warming cannot be clearly defined. Current assumptions and theories suggest that no significant rise in

sea levels will occur within the time frame of this project (i.e., through 1998).

In Subsection 4.4.2, Noise, Subsection 4.4.2.2, Proposed Action (page 4-23), is revised by replacing the fourth paragraph with the following:

Operation of Power Plant 1A in conjunction with Power Plant 1 would result in the 65-dBa DNL contour being about 2,000 feet from the plants. There are no noise-sensitive land uses within this area.

Subsection 4.4.2.4, Mitigation (page 4-24), is revised by replacing the entire paragraph with the following:

Because no significant impacts have been identified, no mitigation is required.

4.5 ISLAND PLANTS AND ANIMALS

Subsection 4.5.2.2, Proposed Action (page 4-33), is revised by adding at the end of the first paragraph; and Subsection 4.5.2.4, Mitigation (page 4-34), is revised by replacing the existing sentence with the following:

Prior to construction activities, a survey for nests will be conducted and bird nesting areas will be avoided to the extent possible during construction.

4.8 ARCHAEOLOGICAL/CULTURAL/HISTORICAL RESOURCES

Subsection 4.8.1.2, Proposed Action (page 4-41), the first paragraph is revised by deleting the sentence (beginning on line 7) "The proposed . . . in this area."

Subsection 4.8.2.2, Proposed Action (page 4-43), the first paragraph is revised by the deletion of the reference to unaccompanied personnel housing on Kwajalein.

Subsection 4.8.2.4, Mitigation (page 4-43), the second paragraph is revised by the deletion of the reference to unaccompanied personnel housing on Kwajalein.

4.9 LAND USE

Subsection 4.9.2, Proposed Action (page 4-45), the second paragraph is revised by the deletion of the second sentence.

4.10 SOCIOECONOMIC CONDITIONS

Table 4.10-4 (page 4-50) is amended as follows:

Table 4.10-4
ESTIMATE OF ROOMS REQUIRED BY UNACCOMPANIED PERSONNEL

Description	Fiscal Year									
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
<u>No-Action Alternative</u>										
Total rooms currently required	1,137	1,137	1,137	1,137	1,137	1,137	1,137	1,137	1,137	1,137
Total supply										
Unaccompanied personnel accommodation meeting Army standards ¹										
Existing	520	520	520	520	520	520	520	520	520	520
Programmed modernization of existing 30 units				30	30	30	30	30	30	30
Total existing supply	520	520	520	550	550	550	550	550	550	550
Net surplus (shortage)	(607)	(617)	(617)	(587)	(587)	(587)	(587)	(587)	(587)	(587)
<u>Proposed Action</u>										
No-Action rooms required	1,137	1,137	1,137	1,137	1,137	1,137	1,137	1,137	1,137	1,137
Additional rooms required	0	4	10	37	37	33	0	0	0	0
Total rooms required	1,137	1,141	1,147	1,174	1,174	1,170	1,137	1,137	1,137	1,137
Total existing supply	520	520	520	550	550	550	550	550	550	550
Net surplus (shortage)	(617)	(621)	(627)	(624)	(624)	(620)	(587)	(587)	(587)	(587)
<u>Change of Duration Alternative</u>										
No-Action rooms required	1,137	1,137	1,137	1,137	1,137	1,137	1,137	1,137	1,137	1,137
Additional rooms required	0	4	4	4	10	25	25	8	8	8
Total rooms required	1,137	1,141	1,141	1,141	1,147	1,162	1,162	1,145	1,145	1,145
Total existing supply	520	520	520	550	550	550	550	550	550	550
Net surplus (shortage)	(617)	(621)	(621)	(591)	(597)	(612)	(612)	(595)	(595)	(595)

¹USAKA has adopted AR 210-11 and the Army Corps design standards for future conversion and construction of unaccompanied housing. Based on these standards, USAKA will strive toward providing each unaccompanied personnel an individual bedroom with bathroom facilities to be shared by two persons.

Sources: Information provided by USAKA and USASDC, Huntsville, Alabama.

In Subsection 4.10.1.2, Proposed Action (page 4-52), the second paragraph is revised to read:

Table 4.10-4 shows UPH needs and compares the expected demand and supply. The Proposed Action would result in a net total deficit of 627 units in FY91, 624 units in FY92 and FY93, and 620 units in FY94. From 1995 through 1998, the total deficit would be 587 units. This deficit represents a significant impact because there would not be an adequate supply of housing to meet demand through 1998.

In Subsection 4.10.1.3, Change of Duration Alternative, (page 4-53, line 7) the sentence beginning, "The deficit of ... " is revised to read:

The deficit of UPH would be greatest (621) in FY90 and FY91 and drop to 612 in FY94 and FY95, and 595 in FY96 to FY98.

4.12 UTILITIES

Subsection 4.12.1, Water Supply, is revised by replacing the last sentence of Subsection 4.12.1.1, No-Action Alternative (page 4-66), with the following sentence:

Recent drinking water analysis shows that THMs slightly exceed the EPA SDWA standard on Kwajalein Island. (See revised Subsection 3.12.1.1.)

Subsection 4.12.1.2, Proposed Action (page 4-66), is revised by the addition of the following after the bulleted items:

Increased population and mission activities increase the potential for drinking water contamination by hazardous materials and waste.

Subsection 4.12.1.4, Mitigation (page 4-68), is revised by the addition of the following sentence at the end of the first paragraph:

Mitigation measures for the risk of water supply contamination by hazardous materials or waste would be the implementation of improved waste handling practices, described in Subsection 4.12.4.4.

Subsection 4.12.2, Wastewater Collection, Treatment, and Disposal, Potential Areas of Concern (page 4-68), is revised by the addition of the following sentence after the end of the last sentence on the page:

Increased mission activities could increase the amounts of nondomestic wastewater entering the wastewater system, increasing the possibility of contaminating of the wastewater system and its effluents.

Subsection 4.12.2.1, No-Action Alternative (page 4-69), is revised by the addition of the following sentence at the end of the paragraph:

A number of nondomestic sources of wastewater entering the wastewater systems on Kwajalein and Roi-Namur have been identified.

Subsection 4.12.2.2, under the heading Roi-Namur (page 4-70), the text is revised by replacing the third through final sentences of the first paragraph and the entire second paragraph with the following material:

An alternative waste treatment standard is being developed for USAKA in consultation with the U.S. State Department, EPA, USAKA, and the RMI. With approval of the alternate standard, the Roi-Namur sewage treatment plant is proposed to be designed to achieve primary treatment. Sewage will be screened and discharged through the existing outfall, which will be extended to a depth of no less than 30 feet.

Subsection 4.12.2.2, Proposed Action, is revised by the addition of the following sentence at the end of the text on page 4-70 under each of the headings Kwajalein and Roi-Namur:

Increased mission activities could increase the amounts of nondomestic wastewater entering the wastewater system, increasing the possibility of contaminating the wastewater system and its effluents.

Subsection 4.12.2.4, Mitigation (page 4-71), is revised by the addition of the following at the end of the paragraph:

Mitigation for the impacts of nondomestic sources of wastewater would be provided by the proposed

improvements to hazardous waste handling practices described in Subsection 4.12.4.4. These include a comprehensive hazardous waste inventory study to identify all sources and disposition of hazardous waste, including hazardous waste entering the wastewater system.

Subsection 4.12.3.1, No-Action Alternative (page 4-72), is revised by the addition of the following material at the end of the subsection:

In mid-1989, USAKA began implementing new waste handling practices (described in more detail in revised Subsection 3.12.4.2). Waste oil is no longer burned in open pits; instead, waste oil is collected in drums for disposal. Batteries are now drained and neutralized and spent battery casings are no longer landfilled, but are segregated for proper disposal. Asbestos is no longer disposed of in USAKA landfills and a number of asbestos-containing areas in the landfills have been identified for cleanup.

Subsection 4.12.4.1, No-Action Alternative (page 4-76) is revised by the addition of the following text at the end of the first paragraph:

Both the Spill Prevention, Controls, and Countermeasures Plan (revised by the Corps of Engineers in March 1986) and the USAKA Marine Operations Manual (January 1988) provide guidance for containing spills of hazardous substances, pollutants, and contaminants. There are limited resources at Kwajalein for use in the event of a spill such as oil flotation booms and skimmers. USAKA is revising the USAKA Spill Prevention, Controls, and Countermeasures Plan to implement procedures that will assure effective prevention, control, and countermeasure practices.

In mid-1989, USAKA began implementing new hazardous materials and waste management practices, described in revised Subsection 3.12.4.2. The new practices are intended to bring USAKA into substantive compliance with applicable regulations governing hazardous materials and waste.

4.14 RANGE SAFETY

Subsection 4.14.1.2, Proposed Action, is revised under the heading Meck Island by the addition of the following text at the end of the first paragraph on page 4-90:

The proposed actions will include the use of MMH as fuel for the maneuvering systems of some KVs. Monomethyl hydrazine is listed by the American Conference of Governmental Industrial Hygienists as a suspected human carcinogen. As such, comprehensive procedures will be used for the storage and handling of MMH to prevent human exposure both during normal use or from accidental discharge (see Subsection 4.14.1 of the DEIS). During missile maneuvering, MMH is consumed in the chemical reaction that provides rocket thrust. The resultant combustion products are water vapor, ammonia, and carbon dioxide.

4.15 ELECTROMAGNETIC RADIATION ENVIRONMENT

Subsection 4.15.2, Proposed Action, is revised by the addition of the following material after the first paragraph on page 4-99:

Analysis of the cumulative impacts of the proposed GBR-X radar and the existing radars on Kwajalein Island prepared for the GBR Environmental Assessment shows that electric field power densities will not exceed 4.3 mW/cm^2 anywhere on Kwajalein Island when the GBR-X radar and other Kwajalein Island radars are operated singly or together. In the housing area on the northeast side of Kwajalein Island, electric field power densities are predicted not to exceed 0.366 mW/cm^2 .

NONTHERMAL HEALTH EFFECTS RESULTING FROM ELECTROMAGNETIC RADIATION EXPOSURE

Standards and guidelines developed by the U.S. Army, the American National Standards Institute, and the Occupational Safety and Health Administration for controlling human exposure to radiation from radars and other emitters are based on the well-documented thermal effect of microwave and radio frequency radiation. A growing body of scientific literature suggests that electrical and magnetic fields may pose a threat to public health

at field strengths significantly below those that cause cellular heating in biological systems. The available literature, largely on electrical and magnetic fields of electrical power equipment in the extremely low frequency (ELF) range, is not conclusive. Moreover, it is difficult to relate these studies to the potential effects of radiation in the much higher microwave and radio frequency ranges.

The following material summarizes the current research on nonthermal effects of electrical and magnetic fields. Much of the following discussion paraphrases or quotes directly a recent survey of the topic prepared by the Office of Technology Assessment (OTA) ("Biological Effects of Power Frequency Electric and Magnetic Fields: OTA, 1989).

The frequency range that has been the subject of most of the scientific research concerning non-thermal effects is the 30 to 300-Hertz (Hz) range, which is also designated as the Extremely Low Frequency Range, or ELF. By contrast, the operating frequencies of most radars are in the megahertz (millions of hertz) or gigahertz (billions of hertz) range. Research does not yet provide conclusive evidence (positive or negative) about nonthermal effects of fields generated by radar and microwave frequencies. A few studies have looked at the effects of very high frequency emissions that are modulated or "pulsed" at lower frequencies (see below, ELF-Modulated Radio Frequency Exposures).

ELF experiments conducted in the laboratory have not thus far established a method for predicting how biological effects seen at the cellular level will affect the whole organism. Many of the basic axioms of toxicology and environmental health concerning threshold dose response relationships, true for many chemical and ionizing radiation exposures, may not directly apply to ELF fields. In the case of ELF fields, it is not yet clear what measures of exposure or dose are relevant (see Cellular Level Experiments, below). It may not be safe to assume that if ELF field exposure leads to health risks, exposure to stronger ELF fields or exposure for longer periods is worse

than exposure to weaker ELF fields or exposure for briefer periods.

The OTA background paper continues " ... under specific circumstances even weak low-frequency electromagnetic fields can produce substantial changes at the cellular level and in a few experimental settings, effects have also been demonstrated at the level of the whole animal. Epidemiological evidence, while controversial and subject to a variety of criticisms, is beginning to provide a basis for concern about the risks from chronic exposure." The authors of the OTA background paper summarize that, "In our view, the emerging evidence no longer allows one to categorically assert that there are no risks. But it does not provide a basis for asserting that there is a significant risk."

The following paragraphs describe the findings of several experiments involving the biological effects of ELF exposures. The experiments are divided into three categories:

- Cellular level experiments
- Whole animal and human studies
- Cancer and electromagnetic fields:
epidemiological studies

CELLULAR LEVEL EXPERIMENTS

Calcium Efflux Across Cellular Membranes

The flow of calcium ions across the cell membrane in response to extracellular signals is an important means of transmitting signals from the outside to the interior of the cell. Calcium flow governs physiological processes such as muscle contraction, egg fertilization, and cell division. Most of the intracellular calcium is normally bound to molecules in the cell. Calcium is also present in the structure of the membrane itself, to be released in the event of an appropriate triggering signal.

The phenomenon most studied at the cellular level is the efflux of calcium ions from cells as a result of exposure to 60-Hz fields. A decrease in the outward flow of calcium ions from the cell membranes of tissue preparations of chick brain

exposed to ELF fields, compared with unexposed tissue preparations was first demonstrated by Adey and Bawin in 1976.

In an independent set of experiments, a change in calcium efflux was observed (Blackman, 1982); however, the Blackman study observed an increase rather than a decrease of calcium ion flux, with a complex pattern of several frequency ranges, or "windows." Blackman studied frequency ranges of 1 to 30 Hz and 45 to 105 Hz and the intensity range of 1 to 70 volts/meter (V/M). Further experiments showed that the position of frequency and amplitude windows was influenced by the strength and relative orientation of any static magnetic field superimposed on the AC field (Blackman et al., 1985). That is, the local geomagnetic field caused by the earth itself was an important variable in the calcium-efflux phenomenon and the results appeared to indicate that a larger dose or a more intense field does not produce a stronger effect (the efflux of calcium ions), or even any effect, compared with a smaller dose or a less intense field.

Chromosomal Damage and Interference with DNA Synthesis and RNA Transcription

Nuclear DNA is the primary constituent of the chromosome and carries the genetic code. RNA lies outside the cell nucleus and its function is to transcribe the DNA command codes into proteins, which are necessary for the cell to function. Cancer-initiating agents such as ionizing radiation and some chemicals cause direct damage to DNA by mutations. ELF fields do not have enough energy to break bonds or otherwise disrupt the structure of DNA.

Three extensive independent studies exposed human lymphocytes, Chinese Hamster Ovary Cells (CVO), and chromosomes from blood samples of mice to 60-Hz fields of 50 kV/M (Benz, 1987; Cohen, 1986; Livingston, 1986). These experiments were all negative and led to the conclusion that it is unlikely that ELF fields induce sister chromatid exchange (SCE) or other forms of chromosomal damage. SCE is a chromosomal defect known to result from agents such as ionizing radiation.

Liboff (1984) and Goodman (1986) observed changes in DNA synthesis rates and alterations in the transcription patterns of RNA leading to structurally altered proteins in cells exposed to low-intensity ELF fields. Goodman's study demonstrated that the rate of production of the normal proteins made by the cell is increased. Because protein synthesis is extremely complex, these experiments provide no simple interpretation concerning the mechanisms or potential effects on organisms.

Interaction with Cells Relevant to Cancer

It has been hypothesized that ELF fields promote cancer formation or cancer growth rather than initiate cancer (Cole, 1987; Guddon, 1981; Berenblum, 1975; Trosko, 1983; and Trosko, 1985). This observation appears to be consistent with the fact that ELF fields have not been known to cause aberrations in DNA structures.

The presence of certain cellular enzymes and other biochemicals is often used as an indicator of malignancy. Ornithine decarboxylase (ODC) is one such enzyme. ODC is present in all cells; it is essential for cell growth because it helps synthesize the biochemicals that are necessary for DNA and protein synthesis. Any agent that promotes cell growth also promotes ODC activity. Thus, factors that increase ODC activity may, but do not always, lead to tumors. Normal fibroblasts (classically used in tumor promotion experiments) were exposed to 60-Hz electrical fields at 10 mV/cm and there was a twofold increase in ODC activity (Cain, 1986).

Other studies have been conducted in this area. Most study results are consistent with the hypothesis that fields can promote tumors, but the studies carry with them the warning that any potential relationship between the field intensity and the degree of promotion may be highly complex.

WHOLE ANIMAL AND HUMAN STUDIES

Experiments with Circadian Rhythm

Experiments on the effect of electrical and magnetic fields on the circadian systems of man, pri-

mates, and lower animals indicate an effect of 60-Hz fields on the periodicity of physiological functioning. It is not clear whether such effects are deleterious or long-lasting.

Central Nervous System Effects

The central nervous system (CNS) uses low frequency fields for its intercellular functions; therefore, the central nervous system is a natural candidate for interaction with electrical and magnetic fields. Animal studies, including the studies of circadian variations introduced by fields, indicate the following specific points:

- Field CNS interactions may involve dependencies at very specific frequencies and intensities, and may vary with the background static fields present, the time of day, and the duration of exposure.
- Developing nervous systems may be particularly susceptible and effects may be latent, manifested only in specific situations or later in time.
- More than any other agent known, except perhaps some psychotropic drugs, ELF fields are specific with respect to the regions of brain tissue affected and the point of administration in the circadian rhythm.

Other studies

Pineal melatonin depression has been associated with cancer growth, and administration of melatonin has been found to slow the growth of cancer. Wilson et al. (1981) found that ELF fields depress pineal melatonin levels in animals.

CANCER AND ELECTROMAGNETIC FIELDS: EPIDEMIOLOGICAL STUDIES

Childhood Cancer and ELF Fields

The areas that have received the most attention in the context of public health and electromagnetic radiation are cancer incidence in children and

cancer as related to occupational ELF field exposure. These concerns first arose from an epidemiological study performed by Wertheimer and Leeper (1979). The authors noted an association between childhood cancer and homes classified as being near "high-current-configuration" distribution lines, which were likely to produce stronger than average magnetic fields.

Four studies have been completed since the Wertheimer study. Two (Fulton, 1980; Myers, 1985) have shown no correlation between cancer and estimated exposure to magnetic fields; two other studies (Tomenius, 1986; Savitz et al., 1987 and 1988) found positive correlation.

Occupational Exposure to ELF Fields and Cancer

Epidemiological data on the incidence of leukemia in electrical workers were reviewed to assess relative risk and establish confidence levels associated with specific occupations (Savitz and Calle, 1987). These data were compiled from 11 studies that were conducted between 1980 and 1987. This review indicated that electrical equipment assemblers, aluminum workers, and telegraph, radio, and radar operators all show a relative enhancement for acute leukemia.

Two additional epidemiologic studies were reviewed that evaluated the association between ELF field exposures and leukemia (Cole, 1987). Combined, these studies showed a relative enhancement for acute myelogenous leukemia, myeloid leukemia, and lymphatic leukemia.

As stated in the OTA background paper, "Based on the set of studies discussed above, it is fair to say that there is an indication that occupational exposure in 'electrical occupations' is associated with enhanced leukemia risk. Remember that 'associated' means 'occurs together with;' it does not imply a causative link. The job classifications do not clearly indicate the actual occupational exposure to fields. No confounding variables or household and other exposures have been taken into consideration in these studies. ... Collectively the studies do not provide good evidence that ELF field exposure increases the risk of leukemia. At the same time the evidence

precludes categorical statements that no such risk exists." (OTA, 1989).

The association between brain and CNS tumors and ELF field exposures related to occupations has been examined in several studies. One study by Lin (1985) looked specifically at brain and CNS tumor mortality risk in men with electrical jobs. Lin sought to correlate the brain tumor risk derived from death certificate data with the likelihood of on-the-job exposure. His results indicate statistical significance, consistency, and an association between higher doses and higher risk of brain tumor.

Status of Understanding the ELF Fields--Cancer Association

The association between cancer and ELF fields was first hypothesized by Wertheimer (1979). Studies conducted since then have yielded mixed results. The most thorough epidemiological study conducted to date is the study by Savitz et al. (1988). This study, combined with the cellular level studies described above, provide some evidence to support the possibility that ELF field exposure can act as a cancer promoter. Nonetheless, the OTA background paper concluded that "overall, the evidence now available is too weak to allow firm conclusions either way."

ELF-Modulated Radio Frequency Exposures

Several studies (Adey, 1982; Bawin, 1975; Blackman, 1985; and Lyle, 1983) have demonstrated bio-effects of exposures to radio frequency fields (100 to 1,000 Mhz) that are amplitude-modulated or pulsed at ELF frequencies (zero to 100 Hz). Amplitude modulation, as used here, means that the intensity of the radio frequency field is varied sinusoidally (i.e., in the form of a sine wave) at ELF frequencies, whereas pulsed modulation refers to a field that is rapidly turned off and on (thus showing a square or saw-toothed pattern). Radio frequency fields interact much more strongly with tissues than do ELF fields because electrical fields induced in tissue are proportional to frequency. The radio frequency fields in the experiments listed above induce radio frequency fields of 1 to 10 V/M in exposed tissue.

The OTA background paper states, "Given evidence suggesting that the mechanisms by which fields interact with cells are nonlinear, some scientists have proposed that cells may be capable of 'demodulating' amplitude-modulated fields. That is, cells may be able to extract the ELF components of the high frequency field. If this is true, the resultant ELF fields in tissue would be orders of magnitude larger than the ELF fields induced in humans by the power-frequency fields of power lines and appliances."

Adey and Bawin have shown that ELF magnetic fields between 1 to 100 Hz and also ELF-modulated very high-frequency (VHF) magnetic fields of 147 MHz could alter the outflow of calcium ions from chick brain tissue (Bawin, 1975) as well as from living cats. They also demonstrated the same effect in living cats exposed to low-intensity microwave fields of 450 MHz with the carrier frequency modulated at the ELF frequency of 16 Hz (Adey 1982).

Lyle (1983) found that a 450-MHz field modulated at 60 Hz significantly suppressed the ability of cultured T-lymphocyte cells from mice to suppress cultured cancer cells.

Fletcher et al. (1987) found that cell to cell communication was altered following ELF-modulated microwave exposures in Chinese hamster ovary cells challenged by lymphotoxins.

The research on radio frequency fields modulated or pulsed at ELF frequencies provides the major link to the potential nonthermal effects of radars, including the radars at USAKA. The existing radars at USAKA operate in the megahertz to gigahertz range, but most can be pulsed at lower frequencies. The two existing radars at Kwajalein Island for which there might be some concern about potential cumulative effects in conjunction with the proposed GBR-X are the AN/FPQ-19 and the AN/MPS-36. In addition, there is a lower-powered windfinding radar that has a small hazard zone. The AN/FPQ-19 can be modulated with a pulse repetition frequency (PRF) of 160 pulses per second, and the AN/MPS-36 can be modulated with PRFs of 160, 320, and 640 pulses per second. These pulse rates characterize both the main beams of the radars and any side or grating lobes. The PRFs

for these two radars are higher than the 1 to 100 pulses per second (or Hertz) range implicated in the research.

The specific operating frequencies and pulse repetition frequencies of the proposed GBR-X radar are classified information that cannot be disclosed publicly. However, according to the GBR-X project office, the GBR-X radar will operate in the X-band (8 to 12.5 gigahertz). It will be modulated (pulsed) at a wide range of PRFs, including the range of zero to 100 Hz.

While it cannot be categorically asserted that the operation of the GBR-X radar (singly or in conjunction with existing radars) will have no health risks, the evidence on ELF radiation and pulsed radio and microwave frequency radiation does not support the assertion that there are reasonably foreseeable significant impacts.

SUMMARY AND CONCLUSIONS--NONTHERMAL EFFECTS

The OTA background paper prepared in 1989 includes the most recent research and focuses on fields produced by ELF of 1 to 100 Hz. Few studies have shown links between the conclusions about fields produced by currents in the 1- to 100-Hz range and potential health effects of radio and microwave frequency fields. The major link between the health effects associated with power frequency fields and higher frequency radiation is shown in the studies cited above that identified nonthermal effects when radio and microwave frequency fields are modulated or pulsed at ELF frequencies.

A review of the literature on nonthermal health effects of radio and microwave frequency radiation indicates that additional research is needed. It is not possible to draw firm conclusions about the public health implications of the subtle and complex nonthermal effects of EMR exposure from the cellular experiments, animal studies, and epidemiological studies discussed above. Although some potential effects on public health have been suggested, none of the studies conducted to date allows definite conclusions about possible risk. However, because the existing research is inconclusive and there is no established research protocol or methodology, no reasonably foreseeable

significant adverse impact can be predicted. The conclusions of OTA's background paper about potential health effects of power frequency fields may also apply to the subject of pulsed microwave or radio frequency fields:

"As recently as a few years ago, scientists were making categorical statements that on the basis of all available evidence there are no health risks from human exposure to power-frequency fields. In our view, the emerging evidence no longer allows one to categorically assert that there are no risks. But it does not provide a basis for asserting that there is a significant risk."

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Chapter 7--BIBLIOGRAPHY

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DEPARTMENT OF THE ARMY

HEADQUARTERS, U.S. ARMY KWAJALEIN ATOLL
BOX 26, APO SAN FRANCISCO 96555

Military Liaison Officer

July 17, 1989

Mr. Alfred Capelle
Resources Manager
Alele Museum and
Library
PO Box 269
Majuro, Marshall Islands 96960

Dear Mr. Capelle:

On behalf of Colonel Philip Harris, Commander of United States Army Kwajalein Atoll, please allow me to express our appreciation for your participation in the Public Hearing of July 13, 1989, relating to the Environmental Impact Statement concerning proposed construction at Kwajalein Atoll.

As you are already aware, Colonel Harris shares your concern for the preservation of Marshallese culture and language. This concern can be seen in the Army's use of Marshallese place-names as replacements for the World War II Navy code names previously used on military maps.

In this connection, we wish to request your assistance. In revising the maps, it is quite possible that the cartographers may have misspelled names of some of the islands, or else have used non-standard variants. We would be most grateful if you would provide us with a list of place-names that are spelled incorrectly, along with the correct spellings of the names of those islands. We, in turn, shall attach this list to the final report, and furthermore, we shall endeavor to use correct spellings of those places in the future.

I will pass this list on to Colonel Harris as soon as it is ready.

Sincerely,

A handwritten signature in dark ink, appearing to read "Frank Moore III", is written over a horizontal line.

Frank Moore III
Major, U.S. Army
Military Liaison Officer

July 23, 1989

TO: FRANK MOORE III, MAJOR USA

FROM: ALFRED CAPELLE

SUBJECT: Preferred Spellings for Place Names of Kwajalein Atoll,
per your 17 July '89 letter

PRESENT SPELLING

Kwajalein Atoll
Kwajalein Island
Mejato Island
Ninji, Ninge Island
Roi-Namur Island
Gagan Island
Gellinam Island
Illeginni Island
Ennylabegan Island
Ennugarret Island
Omelek Island
Ebeye Island
Meck Island
Eniwetak Island
Ebadon Island
Gugeegu Island
Ennubirr Island
Gea Pass
South Ambo Channel
North Pass
Milu Pass
Eniwetak Passage
Bigej Channel
South Pass
Mann Passage
Ellep Passage/North Ambo Channel
Onemak West Passage
Onemak East Passage
Wojejairok Pass
Boggerik Passage
Tabik Channel
Nell Passage

PREFERRED SPELLING

Aelöñin Kuwajleen
Kuwajleen
Mejatto
Nini
Ruöt im Nimur
Kowak-Kap
Kiden-Ep
Likijjine
Äne-Ellap-Kap
Äne-Köran
Komle
Epjä
Meik
Äne-wetak
Epatön
Ñeñe
Äne-Bön
Toon-Nini
Toon-Mertak
Toon-Änepiñ
Toon-Milu
Toon-Meik
Toon-Pikeej
Toon-Äne-Buöj
Toon-Maan
To-Mekak
Toon-Likijjine
Toon-Murle
Toon-Wöje-Kap
Toon-Eorrob
Toon-Jäpik
Toon-Nöj

July 22, 1989

Major Frank Moore III
U.S. Army
Military Liaison Officer
Department of the Army
Headquarters, U.S. Army Kwajalein Atoll
Box 26, APO San Francisco 96555

Dear Major Moore:

Thank you for your letter of July 17. I am happy to assist the Army by providing the enclosed listing of traditional Kajin Marshall place names for Aelöñin Kuwajleen (Kwajalein Atoll).

We sincerely appreciate the Army's concern and interest in helping us preserve and perpetuate Marshallese culture and language.

When I met Col. Philip Harris in the Chief Secretary's Office, he asked if Oscar and I could suggest a Marshallese name for the new housing area on the north end of Kuwajleen Island.

This past week I happened to be on Epjä (Ebeye) and had a chance to discuss the subject with Alap Atidrik Maie of Kuwajleen. Consequently, we would like to suggest the name LIBARWATO.

LIBARWATO is the cultural name for a relatively large rock which was once situated on the lagoon shore near the north end of Kuwajleen, in the vicinity of the new housing area. Briefly, the story behind the rock was that once upon a time a lady called LIBARWATO turned into a rock. Being amicable and friendly she helped her fellow islanders in times of difficulty. When she died she continued to help by forewarning them of invaders and impending disasters such as typhoons, tidal waves, etc. Her forewarnings always came true. Whenever deep and resounding rumbling sounds emanate from the rock of LIBARWATO the islanders would know what it means and take the necessary precautions.

As the activities on Kuwajleen are similar in a number of ways to what once upon a time happened there, we feel the name LIBARWATO is appropriate for that housing area instead of "Silver City". While LIBARWATO herself had achieved it, the residents of Kuwajleen are engaged in trying out a defensive system that can protect lives from either natural or man-made disasters. No one then should be surprised when one of these days the deep and rumbling sounds of LIBARWATO are once again heard across the water and sky.

With kind regards,

Alfred Capelle
Alfred Capelle
Resource Protection Officer

cc: Colonel Harris
Chief Secretary DeBrum
Alap Maie